THE

BRITISH PALLADIUM:

OR

Annual Miſcellany of Literature and Science:

For the YEAR 1775.

THE TWENTY-SEVENTH NUMBER PUBLISHED.

In TWO PARTS.

The *Firſt* containing *new*, *general*, and *ſelect*, SUBJECTS: With an *Alphabetical* CHRONICLE (Number IV.) of original Cuſtoms, uſeful Diſcoveries, Arts, and Inventions. Another (Number V.) of the firſt Diſcovery of Countries. Another (Number VI.) of the Beginning of States, Cities, Towns, *&c.* Alſo an *Alphabetical* LIST of the States of *Europe*, and of the Religions of each State. For the Information of young Hiſtorians and Youth at School.—This *hiſtorical Chronology* to be continued yearly in a Variety of different Claſſes; with the *Geography*, *Produce*, *Cuſtoms*, and *Curioſities*, of each Country.

The *Second* comprehending *Anſwers* to former *Enquiries*; and a *Variety* of *new* and *entertaining* Things propoſed.

With which may be had, *The Practical Arithmetician, or Art of Numbers improved:* Being a Set of *new*, *ſhort*, *practical*, and *mechanical*, *Rules*, in all the Branches of *Arithmetic*, on an *entirely new Plan*; exerciſing all Parts of the *numerical Art* with Readineſs and Facility. For the Uſe of *Schools* and *private Tutors*.

Alſo *The Seaman's Guide, or a Key to the Nautical Ephemerides*, for keeping a Reckoning of *Longitude* of Ships at Sea, from Obſervation, *as near as is practical.* — The Whole ſerving both for *Land* and *Sea*.

By the AUTHOR of the *Improved Royal Aſtronomer and Navigator.*

While *Art* ſhall live, and *Science* ſhall extend,
Merit ſhall rule, and be the *Tyro*'s Friend:
No *ſpurious Guide* ſhould lead aſpiring Youth,
The Bane and *Butcher* of important Truth! *Peregrinator.*

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To the PALLADIUM-AUTHOR.

The Progress and present State of LONGITUDE *in* Great-Britain.

SIR, *Qui vult decipi decipiatur.* *July* 20, 1774.

THE *British Longitude* first set out, on its Travels, at *Irwin*'s *Chair*, then proceeded to *Harrison*'s Watch, *Witchell*'s *genuine* parading Plan, and *Dunthorne*'s *Overmatch*; then to *Maskelyne*'s *Moonshine* and *Nautical Ephemeris*, (now exploded,) where it rested for a While. All these Travels of the Longitude, at many thousand Pounds Expence to the *British* Nation, have been performed to no Purpose; *though what has not been may come to pass.*—The yet *unsettled Longitude* again set out on its Travels to *Scotland*, whither the *Commander in Chief of Longitude* dispatched his male and female Assistants and Attendants to accompany it on its Journey to the *Caledonian* Mountains: Who took with them a new complete proved *Watch*, going to *Thirds*, and a long *Pendulum*, whose Vibration, to *one Third* of Time, was first determined at *Greenwich*; and also other necessary Implements were conveyed, in the same Journey, to try the different *Effects* of the Earth's *Gravity* in a *Series* of Observations, in all possible Cases and Circumstances; in the *Valley*, at the *Foot*, on the *Side*, and *Top*, of every Mountain; so that the Journey (at the fresh Expence of the Nation) might *(if possible)* prove pregnant with Success.

Sometime after the *Under-Workers* of the Longitude had been making their *Pendulum Experiments*, as aforesaid, the *Commander in Chief*, Himself, set forward in his GO-CART, *little Breeches*, and *short Pendulum*, (for Ease of Travelling,) with his proper Attendants, (at the national Expence also,) to make the GRAND EXPERIMENT, and to be SPONSOR for the *new-born* BABE of LONGITUDE, provided he found (as to his *ecstatic Joy* it proved) that his repeated Trials, with his *short Pendulum*, in the *Valley*, at the *Foot*, on the *Side*, and *Top*, of the Hill, exactly corresponded (on a nice Calculation) with the *former Trials*, made by the *longer Pendulum*, before his Arrival, at *John a Grot*'s House, in the *Highlands*; the extreme Part of his Destination.

It is easy to imagine what an Excess, or high Tide, of Joy, was felt by our *little Longitude Chief*, when he found that the Success of his *new Discovery* was equal to the *arduous* Undertaking and Sagacity of the Attempt! The great *Archimedes* could not be more elevated, when, going into the Bath naked, and seeing the Water to rise so much, he first took the *Hint* of measuring all *irregular* Bodies, and of discovering the *Quantity* of *false Metal*, mixed with the *true Gold*, in King *Hiero*'s Crown; and, like that *great Mathematician* and *Philosopher*, I make no Doubt but our *little Pendulum Longitudinarian* made an Exclamation to himself, of the Joy he felt, similar to calling out, Εὕρηκα, Εὕρηκα, *I have found it! I have found it!* meaning the *Longitude*, when he found it out by the Motion of his *Pendulum*.

How happy has this *Caledonian* Journey been in the Event! since, by its genuine Improvements, all former *spurious Methods* of Longitude are immediately discovered by the unerring Trial or true Touchstone of the *Pendulum*, from the precise Time of its *Vibration* to the 60th Part of a Second. To be applied hereafter to Practice, as the *Discoverer* of the *Secret* proposes to make it known, at large, in a *thick Folio Volume*, to be printed at the Nation's Expence.

By the *Longitude Pendulums*, all Longitude Calculations in the *Nautical Ephemeris* (however *erroneously* made hitherto) may be adjusted (like a *Hadley*'s Quadrant) to the utmost Precision: So that, by this lately-discovered *Pendulum-Method* of Longitude, of most excellent Use at Land, it will be made (by a proper Reward bestowed on the *ingenious Discoverer*) completely useful at Sea, and what no *Sea-Officer* must be unprovided with (after proper *Tuition*) when he goes on-board: Who will, according to it, be required to keep an exact Reckoning of *Longitude* and *Latitude* in the Journal of his Voyage; as, without doing which, none will be entitled to, or deserve, his Wages.

Hight Whaccum, *said Sir* Sydrophel! *For Pay we've done the Business well!*

Admiralty Coffee-house. *I am, Sir, your humble Servant,* HISTORICUS.

A NEW GUIDE to the YEAR 1775.

PART I.

To find the Day of the Month from the Day of the Week, and Day of the Week from the Month-Day.

Againſt each Month of the Year, to the Right-hand, ſtand the Seven Week-Days, above which ſtand all the Month-Days in that Month, anſwering to each Week-Day.

Contrarily. Under any Month-Day ſtands the Week-Day againſt that Month, at the Angle of Meeting.

MONTHS of the YEAR.	MONTH-DAYS and WEEK-DAYS.						
	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31				
January. October.	Su	Mo	Tu	We	Th	Fr	Sa
February. March. November.	We	Th	Fr	Sa	Su	Mo	Tu
April. July.	Sa	Su	Mo	Tu	We	Th	Fr
May.	Mo	Tu	We	Th	Fr	Sa	Su
June.	Th	Fr	Sa	Su	Mo	Tu	We
Auguſt.	Tu	We	Th	Fr	Sa	Su	Mo
September. December.	Fr	Sa	Su	Mo	Tu	We	Th

For *Conſtruction* of the above Table, *ſee P.* 2, *Palladium*, 1763.

EXAMPLE I. *To find the Day of the Month anſwering to the ſecond Monday in April*, 1775.

To the Right-hand of *April* you find Mo, or *Monday*; directly above which, in the Columns among the Month-Days, ſtand 3, 10, 17, 24, 31, anſwering to all the *Mondays* in *April:* Therefore the ſecond *Monday* is the 10th Day, required. So for other like Caſes.

EXAMPLE II. *To find the Day of the Week on which the 25th of* December, or Chriſtmas-day, *happens*, 1775.

Under 25, the Month-Day, againſt *December*, at the Angle where the *upper* and *Side* Columns meet, ſtands Mo, or *Monday*, required.

NOTES for 1775.	MOVEABLE FEASTS.	SUN riſes.				
Dom. Let. N.S. A	Feb. 12. *Septuageſ.*	Mths.	1ſt	11th	21ſt	*Examples.*
——— O. S. D	Mar. 1. *Aſh-Wed.*		h m	h m	h m	
Golden Number 9	5. 1*Sund. Lent*					Againſt *May*
Epact (or ☽'s Age at	Apr. 16. *Eaſt. Sund.*	Jan.	8 5	7 58	7 45	the Sun riſes
Year's Beginning) 28	May 21. *Rog. Sund.*	Feb.	7 22	7 6	6 30	h m
Sun's Cycle 20	25. *Aſcenſion*	Mar.	6 32	6 12	5 52	1ſt 4 35
Roman Indiction 8	Jun. 4. *Whitſunday*	April	5 31	5 11	4 53	11th 4 20
Era Jul. Pe. *Ja.* 6488	15. *Trin Sund.*	May	4 35	4 20	4 4	21ſt 4 4
-Olymp^ds *Jul.* 2551	Dec. 3. *Advent Sun.*	June	3 51	3 45	3 43	Dif. 15^m in
-Found. Ro. *Ap.* 2528	Ember-Days.	July	3 46	3 54	4 4	24 Hours, &
-Nabonaſſar *Fe.* 2522	Mar. 8, 10, 11.	Aug.	4 20	4 36	4 54	16^m *leſs* for
- Hegira *July* 1154	June 7, 9, 10.	Sep.	5 15	5 32	5 54	10 Ds. or 1^m½
Greg. Era *Oct.* 193	Sep. 20, 22, 23.	Oct.	6 13	6 33	6 33	a Day *nearly*.
Yrs completed at the	Dec. 20, 22, 23.	Nov.	7 12	7 30	7 45	*N. B.* Sun-
Mths, O.S. Olymp. 2		Dec.	7 58	8 6	8 8	riſing ſub.
Yrs more than by *de la Lande**. See *Axioms & Rules*, p. 351, *R. Aſtr.*	*The Reſt the ſame wh his Corn of former Accts in *Con. des Tems.*					from 12^h gives Sun-ſetting.

N. B. The *complete* Years of the ſeveral Æras end at the *Month*, then the *current* Years take Place; each for a Year following.

Aſtronomical

Aſtronomical MOONS *for Greenwich-Obſervatory*, 1775.

New Moon.				First Quarter.				Full Moon.				Laſt Quarter.			
Mths.	d	h	m		d	h	m		d	h	m		d	h	m
Jan.	2	0	10M	——	8	6	4 A	——	16	7	40 A	——	24	7	9 A
	31	10	43M												
Feb.	——	——	——	——	7	10	0 A	——	15	2	48 A	——	23	6	4M
Mar.	1	9	36 A	——	9	4	14M	——	17	7	54M	——	24	2	8 A
	31	8	45 A	[*N. B.* M ſtands for *Morning* and A for *Afternoon.*]											
Apr.	29	8	15 A	——	7	11	32 A	——	15	9	49 A	——	22	8	19 A
May	29	8	34M	——	7	6	29 A	——	15	8	33M	——	22	1	47M
June	27	10	5 A	——	6	11	39M	——	13	4	50 A	——	20	7	50M
July	27	1	2 A	——	6	2	19M	——	12	11	55 A	——	19	3	32 A
Aug.	26	5	5M	——	4	2	17 A	——	11	7	4M	——	18	2	10M
Sep.	24	9	15 A	——	2	12	5 A	——	9	3	10 A	——	16	4	25 A
Oct.	24	0	31 A	——	2	8	20M	——	9	0	48M	——	16	10	28M
					31	3	55 A								
Nov.	23	2	25M	——	29	11	30 A	——	7	0	29 A	——	15	7	15M
Dec.	22	3	2 A	——	29	7	57M	——	6	14	38 A	——	15	4	45M

Add to the Month-day for the Moon's Age.		New ☽.
	No.	d
Jan.	29	1 31
Feb.	30 0	0
Mar.	28	1
Apr.	30 0	29
May	1	29
June	2	27
July	3	27
Aug.	4	26
Sep.	5	24
Oct.	6	24
Nov.	7	23
Dec.	7	22

Here the Day of N. ☽ and No. added for the following Month make up the Days in the preſent Month.

Exam. Mar. N. ☽ 1d, & Apr. 30, added = 31Ds. in Mar. the preſent Month. N. ☽ Sep. 24 & Oct. 6 added = 30Ds. in Sep.

To find Moon's Age.

Ex. I. *Aug.* 17
Add No. 4
Moon's Age 21

Sun and Moon's Place at New Moon.		Sun enters Signs.	
s	o		d
9	11	♒	20
10	11	♓	19
11	11	♈	21
1	9	♉	20
2	8	♊	21
3	5	♋	21
4	4	♌	23
5	3	♎	23
6	1	♍	23
7	1	♏	23
8	1	♐	22
9	1	♑	21

Ex. II. *Jan.* 22
Add No. 29
51
Abate 30
Moon's Age 21

☞ When ☽ Age is above 29 or 30 Ds. ſub. 29 or 30, as 1. & 2d Col^s (ag^t Mth) are 29 or 30.

To find Sun's Place.

Sub. or add Deg. for Ds. bef. or aft. ☉ enters a Sn. for his Place.

Required Sun's Place for May 27, 1775.

21 *May* ☉ Pl. 2^s 0^o
7Ds. & Deg^s. + 7
28 *May* ☉ Pl. 2 7
at Noon.

Sub. and *add* from and to ☽'s Southing for her Riſing & Setting.

☽ Place.		Arc * ∓
s	o	h m
3	0	8 30
4	2	8 15
5	1	7 15
6	0	6 15
7	11	5 15
8	10	4 15
9	0	4 0
9	20	4 15
10	29	5 15
0	0	6 15
0	29	7 15
1	28	8 15

Req. ☽ Pl. *Aug.* 17.
☽'s Age 21^d
Paſt N. + 21 × 13° 1/6
= 9^s 6°
☽'s Pl. at N. ☽. Jul. + 4 4
☽ Pl. *Aug.* 17, Noon 1 10 *

* *A near Comput. only.*

To find ☽'s *Riſing & Setting, Au.* 17, 1775.
☽ m. Pl. fr. ab. 1^s 10°
Arc * corref. ∓ 8^h 21
☽'s So. *Au.* 17, 5m 4
☽ riſes 17^d 8 a 43
Sets 18th 1m 25

N.B. Take the * Arc ∓ neareſt or proport. to ☽'s Place above.

To find the *Tides* at *London.*

Rule. Add 2^h 30^m to Time of ☽'s Southg (fr. the *Table* of her Southing) for Time of High Water *required.*

Ex. Apr. 28, 1775, ☽ ſouths, by *Tab.* follows 28^d 11^h m o^m
Add 2 30

H. W. 1 a 30
Add 5 10

L. W. 6 a 40 at *Lond.* Bridge.

N.B. Time of H. & L. W. at *Lond.* ſerves for Boats and Veſſels bound down & up the R. or fr. ab. & below Bridge, to *Lond.* reſpecty.

Gen. Rule. Add the T. of H. W. at N. and Full ☽ for any *Place*, accord^g to a *Tide-Tab.* to the Time of ☽'s Southing, that Day, for H. W. at that Place.

* This Computation cannot be *nearer*, except the ☽'s Age was given to Hours.

N. B. *The Feſtival marked* * *is preceded by a Vigil or Faſt. If any of the Feaſt-days fall on a* Monday, *the Vigil or Faſt-day muſt be kept on the* Saturday *before, and not on the* Sunday, *which is the greateſt of Feſtivals.*

The Days having this Mark, †, *againſt them are Holidays obſerved at the* Exchequer, Stamp-Office, Exciſe-Office, Cuſtom-Houſe, Bank, Eaſt-India, *and* South-ſea Houſe.

☞ *At the* Cuſtom-Houſe *there is no Holiday on* Valentine, St. David, Shrove-Tueſday, Eaſter-Wedneſday, St. Swithin, Lammas-day, Fire of London, *or* Holy-Rood.

†‡† *The Offices are mentioned* 'All but ſuch and ſuch,' *after* †, *where no Holidays are kept, when they are kept in all the other Offices.*

MEMORANDUMS *for the* YEAR.

JANUARY, XXXI DAYS.

1 1 *Sunday after Chriſtmas.* Circumciſion. †
4 Sir Iſaac Newton b. 1643, N.S.
6 Epiphany, or Twelfth-day. † All but South-ſea Houſe.
8 1 *Sunday after Epiphany.* Lucian.
13 St. Hilary. Cam. Term begins.
14 Oxford Term begins.
15 2 *Sun. after Epiph.* Exchequer opens.
17 Old 12th-day.
18 Priſca. Q. Cha. Birth-day kept. † Ruffians at Portſmouth, on Friday, 1771.
20 Fabian. 1 Return.
21 Agnes.
22 3 *Sunday after Epiphany.* Vincent.
23 Hilary Term begins.
25 Converſion of St. Paul. †
27 2 Return. Pr. Auguſtus Frederick b. 1773.
29 4 *Sunday after Epiphany.*
30 Cha. I. beheaded, 1648-9, O.S. 12m paſt One. †

FEBRUARY, XXVIII DAYS.

2 Purific. B. V. or Candlemas. †
3 Biſhop Blaize. 3 Return.
5 5 *Sun. after Epiph.* Agatha.
9 4 Return.
10 Dies ſcholaſtica at Oxford.
12 *Septuageſ. Su.* Hilary Term ends.
13 Old Candlemas-day.
14 Valentine. † All but Stamp, Cuſtom, and South-ſea Houſe.
19 *Sexageſima Sunday.*
24 St. Matthias.*†
26 *Quinquageſima, or Shrove-Sund.*
28 Shrove-Tueſday.† All but the Cuſtom-Houſe. Hare-hunting goes out.

MARCH, XXXI DAYS.

1 St. David. Anniverſary-Meeting of the Welch Society, who wear a Leek on this Day in Memory of a famous Victory gained over the Saxons.† All but the Stamp and Cuſtom-H. Aſh-Wed. 1ſt Day in Lent. †
2 Chad. B. Cambridge Commencement for B. A. Day after Aſh-Wedneſ.
5 1 *Sunday in Lent.*
7 Perpet. Maurit. Mart.
8, 10, 11, Ember-days.
12 2 *Sunday in Lent.* Gregory Mart.
17 St. Patrick, Biſhop of Ireland.
18 Edward, K. of the W. Saxons.
19 3 *Sunday in Lent.* Joſeph.
20 Cuthbert. Equal Day and Night.
21 St. Benedict.
25 Annunciation of the V. Mary.* LADY-DAY, 1ſt Quarter-D. †
26 4 *Sunday in Lent, or Midlent-Su.*
30 Cambridge latter Act, Thurſday after the 4th Sunday in Lent.
31 Ruffians at Portſmouth, on Friday, 1769. Sir I. Newton died, 1727, N.S.

APRIL, XXX DAYS.

1 Fool's-Cap Day; Hatton-Harry, Exeter Jack, Leonard Libel, Mr. O Fagon, Sanguinarius, Greenovicenſis, Peter Pendulum, &c.
2 5 *Sunday in Lent.*
3 Richard, Bp of Chicheſter.
4 St. Ambroſe.
5 Old Lady-d.
7 Cambridge Term ends.
8 Oxf. T. ends, Sat. bef. Palm-Sun.
9 6 *Sunday in Lent, Palm-Sund.*
13 Maundy

13 Maundy-Thurſd.
14 Good-Friday.†
15 Sun and Clocks together.
16 EASTER SUNDAY.
17 Eaſter Monday.†
18 Eaſter-Tueſday.†
19 Eaſter-Wed.† All but Cuſtom-h.
Alphege.
23 1 *Sund. after Eaſter. Low-Sund.*
St. George. †
25 St. Mark.†
26 Oxford and Camb. Terms begin
Wedneſday after Low-Sunday.
27 Victory of Culloden.
30 2 *Sunday after Eaſter.*

MAY, XXXI DAYS.

1 St. Philip and St. James.† 1 Ret.
3 Eaſter T. beg. Inv. of the Croſs.
6 St. John ante Port. Lat.
7 3 *Sunday after Eaſter.*
8 2 Return.
12 Old May-day.
14 4 *Sunday after Eaſter.*
15 3 Return. Weſtminſt. Election.
Day after 4th Sun. after Eaſter.
19 Dunſtan. Q. Charlotte b. 1744.
21 5 *Su. aft. Eaſter, Rogation-Sun.*
22, 23, 24, Rogation-days.
22 Princeſs Elizabeth born 1770.
23 4 Return.
25 Aſcenſion-day, or Holy Thurſ.†
26 5 Return, Morrow of Aſcenſion.
Auguſtine, 1ſt Abp. of Cant.
No Night, but all Twilight.
27 Venerable Bede.
28 *Sun. aft. Aſcenſion, or 6 S af. Eaſt.*
29 Term ends. K. Charles II.'s Nat.
and Reſt. after 12 Yrs Exile.

JUNE, XXX DAYS.

1 Nicomedes.
Oxf. Ter. ends, Th. bef. Whit-Su.
4 WHIT-SUNDAY.
4 King George III. born 1738. †
23 Whit-Monday.† Boniface.
Prince Erneſt b. 1771.
6 Whit-Tueſday.†
7 Whit-Wedneſday.† All but
the Cuſtom-houſe.
7, 9, 10, Ember-days.
10 Princeſs Amelia b. 1711.† All
but Excheq. and Cuſtom-houſe.
11 *Trinity-Sunday.* St. Barnabas.†
12 1 Return.
14 Oxford Term beg.
16 Sun and Clocks together.
16 Trin. Term begins.
17 St. Alban.
18 1 *Sunday after Trinity.*
19 2 Return.
20 Tranſl. of Edw. K. W. Saxons.
22 Longeſt Day.
24 ST. JOHN BAPTIST.† 2d
Quarter-day.
25 2 *Sunday after Trinity.*
26 3 Return.
29 St. Peter and Paul.†
30 Buck-hunting comes in & con-
tinues till Holy-rood. Exeter &
Wadham Col. Elect. at Oxf.

JULY, XXXI DAYS.

1 No Night, all Twilight.
2 2 *Sun. after Trin.*
Viſitation of the B. V. Mary.
3 Dies Comitiorum. 4 Return.
4 Tranſlat. of St. Martin, Biſhop.
Cambridge Commencement for
B. A. 1ſt Tueſday in July.
5 Old Midſummer-d. Term ends.
7 Tho. à Becket, Church Tyrant.
Cambridge Term ends.
9 4 *Sunday after Trinity.*
10 Oxford Act.
15 St. Swithin.† All but Stamp,
Cuſtom, and South-ſea Houſe.
16 5 *Su. af. Trin.*
20 Margaret, Virgin and Martyr.
22 Mary Magdalen.
Q. of Denmark born 1751. †
All but Exchecq. & Cuſtoms.
23 6 *Sunday after Trinity.*
24 Magdalen College Election.
25 St. James *†
26 Ann, Mother of the B. V. Mary.
27 Portſmouth-Dock fired at 4 in
the Morning, 1770.
30 7 *Sun. after Trin.*
Dog-days begin. Canicula riſes
with the Sun.

AUGUST, XXXI DAYS.

1 Lammas-day.†
4 Crown-Point in America taken
by General Amherſt, 1759.
6 8 *Sun. after Trin.* Transfiguration.
7 Name of Jeſus.
10 St. Laurence.
11 Princeſs of Brunſwic b. 1737.†
All but Cuſt. and S. S. H.
12 Prince of Wales born 1762. †
13 9 *Sunday after Trinity.*
15 Aſſumption of V. M.

16 Bp.

16 Bp. of Oſnaburgh b. 1763.
20 10 *Sunday after Trinity.*
21 Athanaſius. Pr. Wm b. 1765.
24 St. Bartholomew. †
27 11 *Sunday after Trinity.*
28 St. Auguſtine.
29 Beheading of St. John Baptiſt.
30 Sun and Clocks together.

SEPTEMBER, XXX DAYS.

1 St. Giles.
2 London burnt, 1666, O. S. †
3 12 *Sunday after Trinity.*
7 Eunurchus.
8 Nativity of the B. V. Mary.
9 Dog-days end. Canis Major riſes with the Sun at 3 in the Morn.
10 13 *Sunday after Trinity.*
14 Holy-Croſs Day. † All but Sta. Cuſtom and South-ſea Houſe.
17 14 *Sunday after Trinity.* Lambert B.
18 City of Quebec ſurrendered to General Townſhend, 1759. K. George I. and II. landed. † All but at the Cuſtom-houſe.
20, 22, 23, Ember-days.
21 St. Matthew. †
22 K. Geo. III. and Q. Charl. Cor. 1761. † Equal Day and Night.
24 15 *Sunday after Trinity.*
26 St. Cyprian.
28 Sheriffs of London ſworn.
29 ST. MICHAEL, third Quarter-day. † Hare-hunting comes in and laſts till the End of Feb. Princeſs Charlotte b. 1766.
30 St. Jerome.

OCTOBER, XXXI DAYS.

1 16 *Sun. after Trin.* Remigius, Biſhop of Rhemes.
6 St. Faith.
8 17 *Sunday after Trinity.*
9 St. Dennis.
10 Old Michaelmas-day. Oxford and Cambridge Terms begin.
13 Tranſl. of K. Edw. Confeſſor.
15 18 *Sun. after Trin.*
17 Etheldred V.
18 St. Luke. †
19 St. Frideſwide, a Feſtiv. at Court.
22 19 *S. af. Trin.*
25 K. Geo. III. Acceſſ. † Criſpin.
26 King George III. proclaimed, 1760. † All but the Stamp, Exciſe, Cuſtom and S. S. H.
28 St. Simon and Jude. †
29 20 *Sun. after Trin.*

NOVEMBER, XXX DAYS.

1 All Saints. †
2 All Souls. † All but the Stamp, Cuſtom and South-ſea Houſe. Prince Edward born, 1768.
3 1 Return. All-Souls Col. Elect.
4 K. William b. 1605, O. S.
5 21 *Sunday after Trinity.* Gun-Powder Treaſon, 1605. †
6 Mich. Term begins. Leonard.
7 D. Cumberland b. 1745.
8 Princeſs Auguſta Sophia b. 1768.
9 Ld-Mayor's-d. Lon. † All but Ex.
11 St. Martin.
12 22 *Sunday after Trinity.* 2 Ret.
13 Britius, Biſhop.
15 Machutus.
17 Hugh Bp Lincoln. Anniv. Q Eliz. Procl. † All but Cuſt. & S. S. H.
18 3 Return.
19 23 *Sunday after Trinity.*
20 Edmund, King and Martyr.
22 Cecilia. Old Martinmas-day.
23 St. Clement. Baliol College Election Thurſday before St. Andrew.
24 4 Return.
25 D. of Gloſter b. 1743 † Catharine.
26 24 *Sunday after Trinity.*
28 Term ends.
30 St. Andrew. † Anniverſary Meeting of the Royal Society.

DECEMBER, XXXI DAYS.

3 *Advent Sunday.*
4 Barbary.
6 Nicholas.
8 Conception of the B. V. M.
10 2 *Sunday in Advent.*
13 Lucy.
16 O Sapientia. Camb. Term ends.
17 3 *Sun. in Advent.* Oxf. T. ends.
20, 22, 23, Ember-days.
21 St. Thomas. †
22 Shorteſt Day.
23 Sun and Clocks together.
24 4 *Sunday in Advent.*
25 CHRISTMAS-DAY, 4th Quarter-Day. Fox-hunting comes in and laſts till Lady-day.
26 St. Stephen. †
27 St. John the Evangeliſt. †
28 Holy Innocents.
31 1 *S. af. Chriſt.* Silveſter, P. Rome.

A TABLE *of the* MOON's *Southing, or Times when she passes the Meridian of* Greenwich Observatory, *for the Year* 1775. *For the Use of Seamen, in finding the Time of Tides, &c.*

D.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	Noon.	1a 0	11m39	1a 3	1a28	2a38	2a47	3a37	4a45	5a31	7a19	7a47
2	0a29	1 55	0a34	1 53	2 18	3 25	3 31	4 21	5 37	6 28	8 13	8 36
3	1 31	2 48	1 26	2 42	3 8	4 11	4 15	5 6	6 32	7 27	9 5	9 26
4	2 30	3 38	2 17	3 32	3 57	4 56	4 58	5 53	7 29	8 25	9 57	10 15
5	3 25	4 27	3 7	4 21	4 45	5 40	5 42	6 44	8 29	9 21	10 48	11 6
6	4 17	5 14	3 56	5 10	5 32	6 24	6 26	7 39	9 29	10 17	11 40	11 57
7	5 6	6 1	4 45	5 59	6 18	7 8	7 14	8 37	10 29	11 11	Morn	Morn
8	5 53	6 49	5 33	6 46	7 3	7 53	8 4	9 37	11 27	Morn	0 31	0 48
9	6 39	7 36	6 22	7 33	7 48	8 40	8 58	10 40	Morn	0 5	1 23	1 38
10	7 25	8 23	7 10	8 19	8 32	9 30	9 55	11 41	0 23	0 57	2 15	2 28
11	8 11	9 11	7 57	9 5	9 18	10 23	10 56	Morn	1 18	1 49	3 7	3 16
12	8 58	9 58	8 45	9 50	10 5	11 20	11 58	0 41	2 11	2 41	3 56	4 2
13	9 45	10 45	9 31	10 36	10 54	Morn	Morn	1 38	3 3	3 33	4 45	4 47
14	10 32	11 31	10 17	11 23	11 46	0 19	1 0	2 31	3 54	4 24	5 32	5 30
15	11 20	Morn	11 3	Morn	Morn	1 21	2 0	3 24	4 44	5 14	6 18	6 12
16	Morn	0 16	11 48	0 11	0 41	2 22	2 57	4 14	5 35	6 4	7 2	6 54
17	0 6	1 1	Morn	1 1	1 39	3 21	3 51	5 4	6 24	6 51	7 45	7 37
18	0 52	1 46	0 34	1 54	2 38	4 17	4 42	5 54	7 14	7 38	8 28	8 22
19	1 37	2 31	1 21	2 49	3 38	5 11	5 31	6 43	8 2	8 23	9 12	9 10
20	2 22	3 17	2 9	3 46	4 36	6 2	6 19	7 32	8 49	9 7	9 57	10 1
21	3 6	4 5	2 59	4 44	5 33	6 50	7 7	8 20	9 35	9 51	10 43	10 55
22	3 50	4 55	3 51	5 42	6 27	7 38	7 55	9 9	10 20	10 35	11 33	11 52
23	4 35	5 48	4 46	6 39	7 18	8 26	8 44	9 56	11 4	11 20	0a26	0a52
24	5 21	6 44	5 43	7 34	8 8	9 13	9 32	10 43	11 48	0a 6	1 21	1 52
25	6 10	7 42	6 41	8 28	8 57	10 1	10 21	11 29	0a32	0 54	2 19	2 51
26	7 2	8 42	7 39	9 20	9 45	10 50	11 9	0a13	1 17	1 44	3 17	3 47
27	7 57	9 42	8 37	10 10	10 33	11 39	11 56	0 58	2 4	2 37	4 15	4 41
28	8 56	10 41	9 33	11 0	11 21	0a27	0a42	1 41	2 51	3 33	5 11	5 32
29	9 57		10 27	11 49	0a11	1 15	1 27	2 25	3 42	4 29	6 5	6 22
30	10 59		11 20	0a39	1 0	2 2	2 11	3 9	4 35	5 27	6 56	7 11
31	0a 1		0a12		1 49		2 54	3 55		6 23		7 59

To find Time of H. Water, on any Day of the Month, at any given Place, for 1775.

Gen. Rule. *To the Time of the Moon's Southing* (fr. the above Tab.) *for that Day, add the Time of H. W. at N. and F. Moon in the given Place* (fr. Tide-Tab. p. 105, 106, Pal. 1765, or any other Tide-T.) *and the Sum, abating* 12, *when above* 12h *will be T. of H. W.*

Example. To find the Time of High Water, at *London*, on *Feb.* 24, 1775.

From the above Table, the Moon souths, at London, *on that Day,* 6h 44m Morn.
To which add the constant Time of High Water at New and Full, Lond. 2 30

Time of High Water, Feb. 24, *at* London, 9 14 M. *req.*
Add for next Low Water, 5 30

Low Water at London, Feb. 24, 1775, 2 44 Aft.

N. B. *Time of H. W. serves for Boats & Vessels bound to Places below Bridge, fr.* Lond. *and Time of Low Water serves for Boats & Vessels bound to Places above Bridge, fr.* Lond.

*** *Seamen may determine the Time of H. & L. W. at all Places by the foregoing* Gen. Rule, *fr. the above Tab. and the constant Time of H. W. at N. & F. Moon, at each Place, in a Tide-Table. The above Table is also of Use for finding the Moon's near Time of Rising and Setting, from her mean Place, and Semi-duration Arc, for any Place.*

TABLE

TABLE *of the Eclipses of the first* SATELLITE *of* JUPITER, *for* Gr. Obs. 1775.
For finding the Difference of Longitude, *by Sea or Land.*

	January.				February.				March.				April.				May		June.	
	Emersions				Emersions				Emersion				Emersion				☿ is still so		Immers.	
D.	h	m	s	D	h	m	s	D.	h	m	s	D.	h	m	s		near the Sun,		☿'s Con-	
1	2	1	40	1	2	1	39	1	9*46		5	2	6	35	33		his Ecl. can-		figurations	
2	20	30	27	2	20	30	24	3	4	15	19	4	1	4	58		not be seen		and Satel.	
4	14	59	12	4	14	59	12	4	22	44	45	5	19	34	21		this Month.		cannot be	
6	9*28		3	6	9*28		3	6	17	14	7	7	14	3	47		The Faith of		seen in	
8	3	56	50	8	3	56	52	8	11	43	28	6	8	33	11		Longitude-		*May*, nor	
9	22	25	48	9	22	25	43	10	6	12	51	11	3	2	35		Professors!		1st Part	
11	16	54	44	11	16	54	40	12	0	42	17	12	21	31	55		Poor *de la*		of this	
13	11	23	43	13	11	23	40	13	19	11	40	14	16	1	12		*Lande!* who		Month.	
15	5*52		45	15	5*52		43	15	13	41	7	16	10	30	30		lent his Cal-	D.	h	m s
17	0	21	50	17	0	21	50	17	8*10		34		☿ is now				culations, but	15	12	40 12
18	18	50	53	18	18	50	52	19	2	40	1		and conti-				now can lend	17	7	8 27
20	13	20	4	20	13	20	3	20	21	9	24		tinues so				no more, be-	19	1	36 45
22	7*49		13	22	7*49		9	22	15	38	56		nr the ☉,				ing jockeyed	20	20	4 55
24	2	18	25	24	2	18	26	24	10	8	20		that the E-				out of his	22	14	33 17
25	20	47	33	25	20	47	35	26	4	37	49		clips of his				Employment	24	9	1 32
27	15	16	55	27	15	16	53	27	23	7	15		1st Satel.				by those he	26	3	29 49
								29	17	36	47		cannot be				had befriend-	27	21	58 5
								31	12	6	7		seen.				ed.	29	16	26 20

	July.				August.				Septemb.				October.				Novemb.				Decemb.			
	Immers.				Immers.				Immers.				Immers.				Immers.				Emersions			
D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s	D.	h	m	s	
1	10	54	33	2	7	26	27	1	9	36	33	1	11*49		40	2	8*26		39	2	10*24		33	
3	5	22	55	4	1	55	5	3	4	5	31	3	6	18	39	4	2	55	7	4	4	52	22	
4	23	51	6	5	20	23	45	4	22	34	29	5	0	47	34	5	21	23	27	5	23	20	10	
6	18	19	30	7	14*52		26	6	17	3	31	6	19	16	29	7	15*51		49	7	17*47		55	
8	12	47	50	9	9	21	6	8	11*32		34	8	13*45		20	9	10*20		1		Emersions			
10	7	16	12	11	3	49	54	10	6	1	34	10	8	14	14	11	4	48	21	9	14*25		38	
12	1	44	29	12	22	18	42	12	0	3	37	12	2	43	5	12	23	16	35	11	8	53	26	
13	20	12	47	14	16	47	29	13	18	59	38	13	21	11	55	14	17*44		47	13	3	21	9	
15	14*41		13	16	11	16	21	15	13*28		40	15	15*40		41	16	12*12		54	14	21	48	50	
17	9	9	40	18	5	45	10	17	5	57	43	17	10*	9	27	18	6*41		3	16	16*16		39	
19	3	38	3	20	0	13	59	19	2	26	44	19	4	38	11	20	1	9	3	18	10*44		22	
20	22	6	36	21	18	42	53	20	20	55	45	20	23	6	52	21	19	37	6	20	5*12		7	
22	16	35	2	23	15*11		45	22	15*24		40	22	17*35		31	23	14*	5	6	21	23	39	49	
24	11	3	33	25	7	40	40	24	9	53	46	24	12*	4	6	25	8*32		59	23	18	7	33	
26	5	32	5	27	2	9	41	26	4	22	43	26	6	32	40	27	3	0	54	25	12*35		15	
28	0	0	31	28	20	38	37	27	22	51	43	28	1	1	15	28	21	28	48	27	7*	3	5	
29	18	29	12	30	15*	7	35	29	17*20		45	29	19	29	45	30	15*56		40	29	1	30	52	
31	12	57	47									31	12*58		15					30	19	58	40	

To find the Difference of Longitude from Greenwich Observatory.

Rule. The Difference of Time between any *Eclipse* of *Jupiter's first Satellite*, at *Greenwich*, happening as above, and the Time the same *Eclipse* is observed to happen under a distant Meridian, being turned into *Degrees*, at Sea or Land, will be the Difference of Longitude between *Greenwich* and the Place of Observation.

Example. Eclipse of *1st Satellite* of *Jupiter* at *Greenwich*, *Feb.* 6d 9h 28m 3
The same Eclipse being observed at Sea, or a distant Port, *sooner*, 6 1 29 28s

Hence, Dif. Lon. to the *West* of *Greenw* is 119°38'45", req. Dif. *sooner*, 7 58 35

Two ECLIPSES *of the* SUN *and two of the* MOON, *for* 1775.

According to our ingenious Correſpondent, Mr. *Michael Wood*, of *Epſom*, in *Surry*.

I. *Of the* MOON, February 15, inviſible.

By the Durham *Tables.*

	h	m	s	
Beginning	1	33	49	Apparent Time. *Wood.*
Ecliptic Oppoſition	2	47	16	
Middle	2	55	50	
End	4	17	51	
Digits eclipſed	6°	14′	56″	

According to the Nautical Ephemeris.

	h	m	
	1	32	Apparent Time. *Maſkelyne.*
	2	56	
	4	20	
	6°	32′	

	h	m	s
Moon riſes	4	58	0
Total Darkneſs	2	44	2
Sun's Place	♒	26°	50′ 20″
☽ in Ecliptic	♌	26	50 20
☽'s hourly Motion		2	31
☉'s horizontal Diam.		32	23

☽'s hourly Motion in her Orbit	30′	17″
— horizontal Parallax — —	54	30
———— Diameter — —	29	43
— Latitude S. aſcending — —	38	54
Neareſt Approach of the Centers of the ☽ and Earth's Shadow	38	42
Parts deficient — — — — —	15	29

Wood.

II. *Of the* SUN, March 1, inviſible.

Ecliptic Conjunction 9h 47m, Night, equal Time. *Wood.*

9h 34m 0s, in ♓ 11° 11′, ☽'s Lat, 41′ S.

9 5 40 centrally eclipſed on the Meridian in Lat. 52° 35′ S. Longitude 136 25 W. of *Greenwich*. *Maſkelyne.*

☉ & ☽'s Pl. in Ecliptic	♓ 11°	11′ 31″
Latitude S. deſcending — —	40	9
Sun's hourly Motion — —	2	30
Sun's horizontal Diameter	32	16

Moon's hourly Motion in her Orbit — — —	36′	43″
— horizontal Parallax	60	20
———— Diameter	32	55

Wood.

III. *Of the* MOON, Auguſt 11, inviſible.

Ecliptic Oppoſition 7h 19m 24s Morn. equal Time.

	h	m	s	
Moon ſets	4	35	0	Apparent Time.
Beginning	5	41	30	
Ecliptic Oppoſition	7	4	33	
Middle	7	10	40	
End	8	30	50	
Total Duration	2	58	20	
Digits eclipſed	10°	11′	4″. *Wood.*	

	h	m	
Beginning	5	42	1-3d App. Time.
Middle	7	11	
End	8	39	2-3ds

Dig. eclipſed 10° 0′ to the South. *Maſkelyne.*

Sun's Place	♌ 18°	19′ 15″
☽ in Ecliptic	♒ 18	19 15
Sun's hourly Motion	2	24
☽ horizontal Diam.	31	34
Moon's hourly Motion in her Orbit	38	5

Moon's horizontal Parallax — —	61′	34″
———— Diameter — —	33	36
——— Latitude N. deſcending —	35	18
Neareſt Approach of the Centers of the ☽ and Earth's Shadow	35	4
Parts deficient — — — — —	28	31

Wood.

IV.

IV. *Of the* SUN, Auguſt 26, inviſible.

Ecliptic Oppoſition 5h 6m equal Time. . . .				Eclip. Oppoſition 5h 6m Morn.	
Sun and Moon's Place in Ecliptic ♍	2°	41′	22″	. . . . .	5° 2′ 42″
Moon's Latitude N. aſcending - - -	43	52		. . . . .	44 N.
Sun's hourly Motion - - - - - -	2	25		Centrally and annularly	
—— horizontal Diameter - - - - -	31	40		eclipſed on the Meridian,	
☽'s hourly Motion in her Orbit - -	29	52		4h 30m Morn. in Latitude	
— horizontal Parallax - - - -	54	6		68° N. Longitude 112°½	
——— Diameter - - - -	29	29		E. of *Greenwich*.	
	Wood.			*Maſkelyne.*	

☞ *The candid Computer may now examine which of theſe Calculations agree neareſt with the Truth of the* Durham *Tables; ſince no Obſervation can be made for trying which Numbers are the moſt correct.*

Mr. *Thomas Cowper*, of *Wellingborough*, our ingenious Correſpondent, who is an able *aſtronomical Computer*, has obliged us with ſeveral *aſtronomical Computations*; one, of an *Occultation*, that happens at the End of the Year paſt, 1774, and Others for ſeveral Years enſuing.

Occultation of Aldebaran *by the* Moon, *by Mr.* Thomas Cowper.

Saturday, *November* 19, 1774, *Beginning* 3h 32m, *Middle* 4h 4m, *End* 4h 35m, *apparent* Time, at *Wellingborough*, in the Morning. —— Mr. *Andrews*, (he ſays,) in *Moore*'s *Almanac*, makes this *Occultation* happen "on the 18th "of *November*, in the Evening, *(a fine Computer for the Company of Stationers!)* "51 Minutes paſt 5, Beginning of Immerſion; and will appear again, at 43 "Minutes paſt 6, after being hid 67 Minutes." — T. COWPER.

Occultation of Saturn *by the* Moon, *by Mr.* Thomas Cowper.

	h	m	s			
Saturday, *Feb.* 18, 1775. Beginning	9	13	56			
Central Ingreſs	9	14	22			
Immerſion	9	14	49			
Viſible Conjunction	9	37	26	*Apparent Time*, *at* Welling-		
Middle of Occultation	9	38	14	borough, *in the Evening*.		
Emerſion	10	2	21	Total Obſcuration	47m	32s
Central Egreſs	10	2	48	Central Duration	48	26
End of final Contact	10	3	15	Whole Duration	49	19

N. B. Saturn is firſt obſcured by the illuminated *Eaſtern* Side of the Moon's Diſk, but emerges from behind the dark *Weſtern* Part thereof.

On *March* 18, 1775, about 4 in the Morning, the *Moon* is in *Conjunction* with (and makes a very near *Appulſe* to) *Saturn*; her upper Limb paſſing but about 9 or 10′ below it. The Moon likewiſe makes an Appulſe to *Saturn* again on *April* 7, and *May* 11, 1775. But the Moon paſſes conſiderably below *Jupiter* at every Conjunction, with him, throughout the Year. She alſo paſſes below *Mars*, till *July* 4, 1775, in the Evening; when her upper Limb *nearly* approaches to him. She is *elevated* ſome Degrees above him, at every Conjunction, the Remainder of the Year.

The ſame Correſpondent has alſo obliged us with his curious *Delineation* and *Computation* of the *Appearances* and *Times* of a *total Eclipſe of the Moon*, which will happen on *Tueſday*, *July* 30, 1776, in Latitude 52° 20′ N. and Longitude 0° 40′ W. of *London*. This Performance we reſerve for the proper Year's *Palladium* to which it belongs.

He has alſo ſent us a Sketch and Calculation of a *ſolar Eclipſe*, (Digits 5° 49′½,) which happens on *Wedneſday*, *June* 24, 1778, in the Afternoon, for the Middle of *England*.

Likewiſe a *Calculation* and *Delineation* of the ſame *ſolar Eclipſe*, as it will appear on the *South* Part of the great *Fiſhing-Bank* of *Newfoundland*, (Lat. 41° 30′ N, Long. 54° W. from *London*,) where it will be *total* above 6 Minutes.

Alſo, *another Type* and *Calculation* of the ſame *ſolar Eclipſe*, as it will appear at *Annapolis Royal*, in *Nova Scotia*, Lat. 45° N. and Long. 64° W. from *London*. — *Another*, of its Appearance at *Philadelphia*, in the Province of *Penſylvania*, Lat. 40° 50′ N. Long. 74° W. of *London*. — *Another*, as it will appear at *Gibraltar*; where, the ingenious Computer obſerves, the *viſible Way* of the *Moon* from the *Sun* will be *nearly parallel* to the *Ecliptic*, (having but little *Curvity*,) approaching to a *ſtrait Line*; yet it will be a little *convex* towards the Sun's Center. The ſeveral Types are different to all other Types that can be formed by *leſs able* Computers.

Another, of the *ſame ſolar Eclipſe*, as it will appear in the *Azores* or Weſtern Iſles. — Who obſerves, that this Eclipſe will be *total*, and nearly *central*, at *Corvo*, the moſt Northerly of all. He has given accurate *Types* and *Properties* to all theſe Eclipſes; and has *ſpecified* (with great Diligence and Diſtinction) the *general Appearances* of this Eclipſe for the Meridian of *London*. He ſhews where the *Penumbra* firſt touches the Earth's *Diſk*, and where the *Eclipſe* firſt begins (Lat. 6° 40′ N. Long. 107° 23′ W. of *London*) in the *Pacific Ocean*. He ſhews alſo where the *Center* of the *Penumbra* enters the Earth's *Diſk*, and the Sun firſt appears *centrally* and *totally* eclipſed, at his Riſing, on the ſame Ocean, Lat. 12° 28′ N. and Long. 240° 15′ W. of *London*. Then, he deſcribes how the *central* Shadow (and total Darkneſs) directs its *Courſe*, North-Eaſtward, over the Kingdom and Gulph of *Mexico*, *Carolina*, and *Virginia*, into the *Atlantic* Ocean; and thence to the South Part of *Newfoundland* Fiſhing-Bank; and, having attained to the Latitude 41° 25′ N. and Longitude 54° 8′ W. he ſhews that the Sun will appear *totally* eclipſed, near to and in the Meridian and nonageſimal Degree, for above the Space of 6 Minutes; at which Time the Planet *Venus* will be ſeen by the naked Eye about 23½ Degrees, and *Jupiter* about 47 Degrees, to the *Eaſtward* of the Sun. Alſo *Mars* will be *conſpicuous*, at the ſame Time and Place, about 7 *Degrees*, and *Venus* about 22 *Degrees*, both *Weſtward* of the Sun, a little before and after Noon.

That, under this *Longitude*, 54° 8′, and in *Latitude* 80° 36′ N. the Sun's *lower* Limb will appear to be juſt *touched* by the Moon's *upper* Limb, as they both tranſit the *Meridian*; happening in *Whale's Sound*, North of *Baffin's Bay*. That, under this Meridian, the Sun will be more or leſs eclipſed, as far Southerly as the Country of *Amazones*, in *South America*, Lat. 10° 35′ S. where the Sun's *Northern Limb* will be in Contact with the Moon's *Southern* one in the *Medium Cœli*. That, from the ſaid *Newfoundland* Fiſhing-Bank, the central and total *Shade* will take a *South-Eaſt Courſe*, paſſing along the *Atlantic* to the *Azores*, or *Weſtern Iſles*, where the Sun will be totally eclipſed for more than 5 Minutes and a Half. And that all the four *Planets* beforementioned (*Venus*, *Jupiter*, *Mars*, and *Saturn*) will be viſible to the naked Eye between 2 and 3 in the Afternoon; as they will in every other Place, where this *Phænomenon* is total and central, if Clouds do not interpoſe.

That, thence the *central Shadow*, paſſing over the Remainder of the *Atlantic Ocean*, will enter the Kingdom of *Morocco*, and thence paſs over *Negro-Land* to *Borneo*, in the Deſarts of *Nubia*, Lat. 20° 21′ N. and Long. 21° E. when the *central Obſcurity* ends at Sun-ſet. That, in the Lat. 14° 35′ N. and Lon. 3° 55′ E. near *Guber* in *Guinea*, the Moon's *Penumbra* will quit the Earth, and the *Eclipſe* will laſt of all *end* at Sun-ſetting, on the *upper* Part of the *Sun*'s Diameter.

REMARK,

REMARK. *If such an* astronomical Computer *as the foregoing had been employed in the Service of the Longitude, instead of the Pretenders to astronomical Computation, who have (through Favour and Interest) received the Longitude-Fees, or Pay, for no Purpose but their own, some good Effect might have been produced in the Longitude-Enquiries long ago: But there are little Hopes of Success (except by the* Longitude-Pendulum) *while unqualified Pretenders, Quack-Astronomers, and ignorant Computers, are employed to do the Work of Men of Ability; such as was Dr.* Halley, *a* Mathematician *and* able Astronomer, *who did as much* Honour *to this Nation as his tiny Successors have since done it* Disgrace.

Mr. *Cowper* has also obliged us with the Sun's Place for every Day of the Year 1775; a Table of the Sun's *Right Ascensions*, and another of his *Declinations*, he carefully computed to the present *Obliquity* of the Ecliptic, 23° 28′; which we have not Room for.

He computed the Moon's Places for the Occultations, through all the lunar Equations, *extra Syzygies*, from the *Durham* Tables; but computed *Saturn*'s Place from Dr. *Halley*'s Tables.

ADVERTISEMENT.

☞ *Our Correspondents, in general, are desired to send all their Letters and Productions before the End of* May *(franked or Post-paid); the sooner they send the more they can be obliged; directed to the* Palladium-Author, *at Mr.* Cole's, Mathematical Instrument Maker, Fleet-street, London. —— *No Letters will be received but what are Post-paid. — Some were refused last Year, unpaid for, and the Writers Time lost.*

NUMBER IV.

ALPHABETICAL CHRONICLE *of* ORIGINAL CUSTOMS, USEFUL DISCOVERIES, ARTS, *and* INVENTIONS.

N. B. b, before a *Date*, stands for Years *before Christ*, and *s*, or no Letter, before a *Date*, stands for Years *since Christ*.

Bef. & since Christ.

Air-pump invented 1654
Air-guns —— 1656
Algebra first known in Europe 1494
Allum brought to Perfection 1609
Anchors invented 578
Arms of England and France first quartered by Edward III. 1358
Arundelian Tables made *b* 264
Assize of Bread first fixed 1202
Baking of Bread invented 1643
Beheading of Peers first used in England 1074
Barometer invented 1643
Bells invented by Paulinus, Bishop of Nola in Campania, about 400; introduced into Churches, about 600; first Set of Ringing-Bells in England hung up at Croyland-Abbey, Lincolnshire 945
Blood, Circulation of the, through the Lungs, first made public by Michael Servetus, a French Physician, 1553; Cialpilinus published an Account of the general Circulation, of which he had some imperfect Ideas, and afterwards improved the Knowledge of it by Experiments, 1569; it was clearly confirmed by Harvey 1628
Bombs invented by a Man at Venlo 1588
Broad-Seal of England first used 1050
Calendar reformed by Pope Gregory 1579
Cards invented in France and first used for the King's Amusement 1391
Champion of England, the first 1377
Cherry-Trees first planted in Britain *b* 100
Chess, the Game of, invented *b* 608

Chiaro-oscuro,

Chiaro-oſcuro, the Art of painting in, with three Plates to imitate Drawings, firſt uſed 1500
Chimnies not known in England 1200
Clocks and Dials ſet up in Churches, 613; firſt made with Pendulums, 1657; repeating Clocks and Watches invented 1676
Cloth, coarſe woolen, firſt made at Kendal 1390
Coaches firſt uſed in England, 1515; in London, 1625; Hackney Coaches increaſed to 1000 1770
Coals firſt imported in London 1357
Cock-fighting inſtituted by the Romans after a Victory they gained over the Perſians *b* 476
Coin firſt uſed in Britain, *b* 23; in Scotland, of Gold and Silver *s* 233
Collars of SS, the Faſhion of wearing them began 1407
Comedy, the firſt, acted at Athens on a Scaffold by Sufarion and Dolon *b* 154
Compaſs, Seaman's, invented 1300
Dancing by cinque Paces introduced into England from Italy 1541
Dieu et mon Droit firſt uſed as a Motto by Rich. I. on a Victory gained over the French 1193
Divorce, the firſt at Rome *b* 234
Earthen Veſſels firſt made by the Romans *b* 1715
Eleuſinian Myſteries firſt uſed at Athens by Eumolpus *b* 1356
Engraving on Wood invented by A. Durer 1521
— on Copper invent. 1481
Æra of Nabonaſſar *b* 747
Æra, Philipic, or Death of Alexander *b* 324
— Contracts, or Seleucidæ *b* 312
— of Chriſt's Birth, A. M. 3962; not uſed till *s* 600, but the civil Account of the Empire was uſed in the mean Time.
— of Mahomet, or Hegira, from his Flight from Mecca, being driven away by the Phylarchæ 617
— of the Grecian Olympiads, the firſt, A. M. 3187. This Account was aboliſhed under the Emperors of Conſtantinople, when they reckoned by Indictions, every one containing 15 Years, the firſt beginning 313
— of the City of Rome, A. M. 3113; and after the Romans reckoned from the 16th Year of the Emperor Auguſtus, A. M. 3936. This Æra was uſed by the Spaniards till the Reign of Ferdinand the Catholic.
— of the World's Creation, by the Jews, the Beginning of Time.
— of the univerſal Deluge A. M. 2656
— of the Confuſion of Languages A. M. 2786
— of Abraham's Journey from Chaldea to Canaan A. M. 2021
— of the Departure of the Child. of Iſrael out of Egypt A. M. 1451
— of the Year of Jubilee A. M. 2499
— of the building of Solomon's Temple A. M. 2932
— of the Captivity of Babylon A. M. 3357
The laſt 8 Æras were uſed by the Jews. But the moſt common Æras, uſed in Chronology, are the two of the World's Creation and of the Birth of Chriſt.
Etching invented by Mazzuoli 1535
Figures, in Arithmetic, firſt uſed in Europe from Arabia 941
Foreſt, New, made 1081
Galleys firſt uſed with 3 Rowers to each Oar, from Corinth *b* 786
Gardening firſt uſed in England, from the Netherlands, whence Vegetables were imported till 1509
Gilding with Leaf-Gold, on Bole Armoniac, Art of, invented by Margaritone 1273
Glaſs invented in Eng. by Benult, a Monk 664
Gold firſt coined in England 1344
Grammarians, the firſt regular Ones flouriſhed *b* 276
Griſt-Mills invented in Ireland 214
Groats and Half-pence the largeſt Silver Coin 1351
Guards firſt uſed for the King's Perſon 1486
Gunpowder diſcovered by Swartz, a Monk of Cologn 1340
Half-pence and Farthings firſt coined by the Britiſh Government, Auguſt 16 1672
Hanged, drawn, and quartered, the firſt of that Puniſhment 1241
Hebrew Points firſt invented 475
Horſe-Guards firſt formed 1550
Hydraulic Fire-Engines invented 1663

Iambic

Iambic Verſe invented by Archilochus who flouriſhed *b* 686
Ich dien, the Bohemian Motto, firſt uſed by the Prince of Wales, after the Battle of Creſſy 1346
Inoculation for the Small-Pox firſt tried on Criminals 1721
Iron diſcovered by the burning of Mount Ida *b* 1432
Iſthmian Games inſtituted by Syſiphus King of Corinth, 15 Years after the Rape of Ganymede *b* 1326
King's Speech, the firſt delivered by Henry I. 1107
Lacteal Veſſels diſcovered by Chance, in opening a Dog, by Aſellius, July 23 1662
— in Birds, Fiſh, &c. by Mr. Hewſon, Surgeon, of London 1770
Lanthorns invented by King Alfred 890
Latin ceaſed to be ſpoken in Italy 581
Leo IX. the firſt Pope that kept up an Army 1054
Logarithms invented by Lord Napier of Scotland 1614
Lotteries firſt eſtabliſhed 1694
Maps and Globes invented by Anaximander *b* 608
Microſcopes firſt uſed in Germany 1621
Monaſtery, the firſt, founded, to which the Siſter of St. Anthony retired 270
Money firſt made of Gold and Silver at Argos *b* 894
Mortars for Bombs firſt made in England 1543
Muſkets firſt uſed in France at the City of Arras 1414
Oil-Painting firſt uſed by John Vaneck 1340
— introduced into Venice by Dom. Venitiano 1450
— introduced into Italy by Antonello 1476
Olympiads, firſt *b* 776; reckoned every 4 Years.
Paper, made of Cotton Rags, in Uſe 1000
— of Linen Rags 1170
— Manufactory introduced into England at Dartford in Kent 1588
Park, the firſt, in England made by Henry I. at Woodſtock 1123
Parthenian Games firſt introduced *b* 1262
Parties, Court and Country, firſt diſtinguiſhed 1621
Penſioners, Band of, inſtituted 1590
Pins firſt uſed in England, 1543; before which Time the Ladies uſed Skewers.
Plaiſter of Paris firſt found out for taking off a Likeneſs by Andr. Verocchio 1470
Politicians, the Term firſt uſed in France 1569
Poſt-Horſes and Stages eſtabliſhed 1483
Prince of Wales, the Title of, firſt given to the King of England's eldeſt Son 1286
Printing invented by J. Fauſtus 1441
— firſt made public by John Guttenburgh of Mentz 1458
— brought into London by William Caxton, a Mercer of London, 1471; who had a Preſs in Weſtminſter till 1494
Prometheus ſtruck Fire from Flints, about *b* 1715
— was the firſt Perſon who is ſaid to have ſtolen it from Heaven.
— became Author of the Arts among the Greeks *b* 1687
Purple diſcovered, about *b* 500
Rains, Storms, and Winds, firſt painted by Lorenzetti 1330
River, New, brought to London 1614
Saddles in Uſe 340
Sail-cloth firſt made in England 1599
Scenes firſt painted for Theatres by Bal. Parifian Siena 1533
Sheep, Engliſh, firſt allowed to be exported to Spain, to the great Injury of the Britiſh Woolen Manufactory 1467
Shillings firſt coined in England 1505
Ships firſt built in Greece *b* 1485
Side-Saddle firſt uſed in England 1388
Silk firſt brought from India 274
— Manufactory introduced into Europe from India by ſome Monks 551
— firſt worn by the Engliſh Clergy 1534
Silver firſt coined in Rome *b* 266
Solar Year introduced by Julius Cæſar *b* 45
Sowing Corn, the Art of, taught by Ceres *b* 1409
Spectacles invented 1299
Sphere invented by Archimedes of Syracuſe *b* 209
Stockings, Silk, firſt worn by the French King 1543

Stockings,

Stockings, Silk, first worn in England by Queen Elizabeth 1561
— Weaving invented by the Rev. Mr. Lee, of St. John's College, Cambridge 1589
Stucco-Work revived by D'Udine, about 1550
Style altered by Auguſtus *b* 8
— again at Rome, by taking 12 Days out of the Calendar 1582
— Gregorian, received at Paris, by taking away 10 Days from the Calendar, Dec. 5 1582
— at London, by taking away 11 Days, Sep. 2 1752
Sun-Dials invented 558
— firſt erected at Rome, when Time was firſt divided into Hours *b* 293
Survey of England made firſt by the Order of Alfred 900
— by William the Conqueror 1080
— by Charles II. 1668
Tar-Water firſt recommended by Bp. Berkly 1744
Tea firſt brought into Europe by the Dutch East India Company early in the laſt Century.
— a Quantity of, brought from Holland by Lord Arlington and Lord Oſſory, 1666; whence it became of general Uſe.
Teleſcopes invented by Z. Janſen, a Spectacle-Maker, at Middleburgh 1590
Thermometers invented by a Dutchman 1610
Thoracic Duct diſcovered in a Horſe by Euſtachius 1563
— in the human Body, by Ol. Rudbec, a Swediſh Anatomiſt, Thomas Bartholine of Copenhagen, and Dr. Joliffee, of England *(ſee Lacteals)* 1653
Tobacco firſt brought into England 1583
— into France 1600
Touching for the King's Evil firſt introduced by Edward the Confeſſor 1046
Tournaments inſtituted by Henry, Emperor of Germany 935
Tourniquet, in Surgery, invented by Morell, at the Siege of Beſançon 1674
— the Screw Kind of, invented by Petit, of France 1718
Tragedy, the firſt acted at Athens, on a Waggon, by Theſpis *b* 535
Trumpets firſt ſounded before the Kings of England, by Order of Offa, King of Mercia 790
Votes of the Houſe of Commons firſt printed 1671
Watches firſt brought to England from Germany 1597
Weights and Meaſures invented *b* 890
Wildfire invented by a Grecian 663
Windmills invented 1299
Wine ſold by Apothecaries for a Cordial 1300
— ſold at 20*s.* the Ton, and the ſecond Sort at 13*s.* 4*d.* 1380
Wood's Patent for coining granted, Jan. 1723
Yeomen of the Guard firſt inſtituted 1486
Zodiac, Signs of the, firſt invented by Anaximander *b* 547

NUMBER V.

ALPHABETICAL CHRONICLE *of the* FIRST DISCOVERY *of* COUNTRIES.

America firſt diſcovered by Columbus, a Genoeſe 1498
— ſettled in James the Firſt's Reign.
Bath Springs diſcovered *b* 871
Braſil Iſles diſcovered by the Portugueſe 1500
Britain firſt diſcovered to be an Iſland about 90
Canada diſcovered by Cabot 1499
Canary Iſles 1491
Cape-de-Verd Iſlands diſcovered 1454
Cape of Good Hope diſcovered by the Portugueſe 1487
Falkland Iſlands diſcovered 1765
Florida diſcovered by Cabot 1512
Hudſon's-Bay diſcovered by Capt. Hudſon 1610
Jamaica diſcovered 1494
Japan diſcovered 1549
Madagaſcar diſcovered by the Portugueſe 1506
Madeira diſcovered by the Portugueſe 1416
Magellan, Streights of, diſcovered 1518
Newfoundland diſcovered by Cabot 1520
Otaheite, or King George III.'s Iſland, diſcovered June 18 1767
Peru diſcovered 1532

Philippine

Philippine Isles discovered by the Spaniards 1706
Solomon Isles in America discovered 1569
South-America discovered by Americus Vespucius 1497
Spain, New, discovered 1518
Trinidado, Isle of, discovered 1497
Virginia discovered by Sir Walter Raleigh 1584
West Indies discovered by Columbus 1498

NUMBER VI.

ALPHABETICAL CHRONICLE *of the* BEGINNING *of* KINGDOMS, STATES, CITIES, TOWNS, *&c.*

Alexandria, in Egypt, built in 17 Days, the Walls whereof were 6 Miles in Circuit 335
Aquitaine erected into a Principality, 1362; re-annexed to the Crown of England 1370
Areopagus first erected at Athens *b* 1272
Argos, Kingdom of, began *b* 1856
Assyria, Kingdom of, began, under Ninus *b* 1856
— lasted about 1264 Years, ending with Sardanapalus. — From its Ruins were formed the Assyrians of Babylon, of Nineveh, and the Kingdom of the Medes.
Babylon, Kingdom of, founded by Nimrod *b* 2640
Balbeck built 14
Bavaria, Dukedom of, founded 1180
— made an Electorate 1258
Bohemia, Kingdom of, founded 550
Bourbon erected into a Duchy 1336
Bremen and Verden vested in George II. by the Emperor 1732
Brittany annexed to the Crown of France 1150
Burgundy, Dukedom of, established 890
Canterbury built *b* 912
Carthage founded by the Tyrians *b* 1259
Carthage built by Queen Dido *b* 896
Cæsaria built in 12 Years by Augustus Cæsar *b* 7
Chichester built by Cissa 547
Colchester built *b* 125
Constantinople founded by the Argives *b* 658
Corinth, Kingdom of, established *b* 1504
Cork, in Ireland, built 1164
Denmark united to Noway 1412
East-Indies settled 1506
Egypt, Kingdom of, began, *b* 2188, and continued 1663 Years; reduced to a Province 331
England became a Kingdom under one Sovereign 809
French Monarchy established 419
Geneva Republic founded 1512
Genoese Republic *b* 63
German Empire founded 813
— Emperor first elected King of the Romans 1056
Grecian Empire founded by Alexander 331
—— commenced 811
Hanover, hitherto but a Village, gained the Privilege of a City, 1178; made the 9th Electorate 1692
Heptarchy, in England, commenced 457
— ended 874
Holland, Republic of, founded 1579
Ilium (or Troy) built *b* 1359
Lombardian Kingdom began, 73; ended 771
London walled, and a Palace built 306
— made a Bishopric 653
— repaired by Alfred 885
— greatly damaged by Fire, 912, 1077, and 1130
— received the Privilege of electing its own Magistrates 1215
— The first Lord-Mayor and Sheriffs chosen by the City 1219
— A Common-Hunt first appointed 1226
— Aldermen first appointed 1242
— Most of its Houses were thatched 1246
— All the Houses built of Wood 1300
— The Privileges taken away, but restored on Submission being made 1366
— The first Lord-Mayor sworn at Westminster who went by Water 1433
— Lord-Mayor's Show instituted 1453
— A Sheriff fined 50*l.* for kneeling too near the Lord-Mayor when at Prayers at St. Paul's Cathedral 1486
— Thames Water first conveyed into the City 1582

London, the City of, chiefly built of Wood, and in every Reſpect very ugly 1600
— The New River firſt brought hither 1613
— The greateſt Part of the City deſtroyed by Fire 1666
— Pilkinton and Shute, City-Sheriffs, ſent Priſoners to the Tower for continuing a Poll after the Lord-Mayor had adjourned it 1682
— The Lord-Mayor and Sheriffs arreſted at the Suit of two pretended Sheriffs, Apr. 24 1683
— The Charter of the City declared forfeited to the Crown, June 12 1682
— Its Privileges taken away but reſtored ſoon after 1688
— It remonſtrated on the King's paying no Attention to their Petition for a Redreſs of Grievances, Mar. 1770
— Braſs Croſby, Eſq. Lord-Mayor, and Alderman Oliver, ſent to the Tower, by the Houſe of Commons, for committing their Meſſenger, Mar. 1771
— City-Trade greatly injured by Bankruptcies 1772
Lucca, Republic, founded 100
Lyons, in France, founded *b* 43
Macedon, Kingdom of, began *b* 814
Madrid, Capital of Spain, built *b* 936
Man, Iſle of, governed by its own Kings from 1065 to 1266
— governed by the Lords of Man from 1403 to 1765, when it was annexed to the Crown of England.
Normandy erected into a Dukedom 876
Oſnaburgh Biſhopric eſtabliſhed 780
Ottoman Empire began 1293
Padua built *b* 1269
Perſian Empire founded *b* 536
Poland eſtabliſhed as a Sovereignty 550
— diſmembered of ſeveral Diſtricts 1772
Portugal, Kingdom of, began 1139
Pruſſia erected into a Kingdom 1701
Ratiſbon built *b* 1187
Roman Empire began *b* 44
— ended *s* 63
Roman Empire in the Eaſt began 378, ended 1202
— in the Weſt began 74
— ended 92
Rome, City of, founded, April 20, *b* 753; the firſt King, Romulus.
Ruſſia eſtabliſhed as an Empire 1721
Sandwich built 957
Sardinia made a Kingdom 1708
Savoy Duchy began 1000
Scots, Kingdom of the, began *b* 328
Shafteſbury built 879
Sicily firſt peopled from Italy *b* 1262
Smyrna built *b* 1050
Spain, Kingdom of, founded 414
— ſubject to the Saracens 713
— recovered from them 1093
— New, eſtabliſhed 1520
Stockholm built 1253
Sweden, Kingdom of, eſtabliſhed 1525
Swiſs Cantons Republic founded 1315
Venice Republic founded 421
— Univerſity founded 1592
United Provinces eſtabliſhed 1579
Wales firſt inhabited by Britons on their being driven out of England by the Saxons 685
— divided into North and South Wales and Powis Land, 970; North Wales continued to 1093, when Henry II. conquered it; South Wales continued to 1282, when Edward I. conquered its laſt Prince and created his own Son Prince of Wales; Powis Land continued till it was annexed to the Crown of England by Henry VIII. in 1536
Waterford, in Ireland, built 1162
Worceſter, City of, built 255
York, City of, built *b* 1233

An ALPHABETICAL LIST *of the* STATES *of* EUROPE, *and of the* RELIGIONS *of each* STATE.

Auſtria, (an Archbiſhopric,) Papiſts.
Bavaria, (a Dukedom,) Papiſts.
Bohemia, (a Kingdom,) Papiſts and Lutherans.
Brandenburgh, (a Marquiſate,) Lutherans, Calviniſts, and Papiſts.
Brunſwick, (a Dukedom,) Lutherans.

Cologn,

Cologn, (an Archbiſhopric,) Papiſts.
Courland, (a Dukedom,) Papiſts and Proteſtants.
Denmark, (a Kingdom,) Lutherans.
England, (a Kingdom,) Church of England, and all Others tolerated except Papiſts.
France, (a Kingdom,) Papiſts.
Genoa, (a Republic,) Papiſts, and Jews tolerated.
Germany, (an Empire,) Papiſts, Lutherans, and Calviniſts.
Greece, (a Part of Turkey,) Mahometans, Jews, &c.
Hanover, (a Dukedom,) Lutherans, Calviniſts, &c.
Heſſe-Caſſel, (a Landgraviate,) Lutherans, Calviniſts, and Papiſts.
Hungary, (a Kingdom,) Papiſts and Proteſtants.
Ireland, (a Kingdom,) all Religions tolerated.
Italy, (a Popedom) Papiſts.
Lucca, (a Republic,) Papiſts.
Malta, (an Iſland,) Papiſts.
Mantua, (a Dukedom,) Papiſts.
Mecklenburgh Schwerin, (a Dukedom,) Lutherans.
Milan, (a Dukedom,) Papiſts.
Modena, (a Dukedom,) Papiſts.
Naples, (a Kingdom,) Papiſts.
Netherlands, or United Provinces, (a Republic,) Papiſts, Calviniſts, &c. tolerated.
Norway, (a Kingdom,) Lutherans.
Palatinate, (a Principality,) Papiſts and Lutherans.
Parma and Placentia, (a Dukedom,) Papiſts.
Piedmont, (a Principality,) Papiſts.
Poland, (a Kingdom,) Papiſts and Lutherans.
Portugal, (a Kingdom,) Papiſts.
Pruſſia, (a Kingdom,) Lutherans, Calviniſts, and Papiſts.
Ruſſia, (an Empire,) Greeks, Calviniſts, and Lutherans.
Sardinia, (a Kingdom) Papiſts.
Savoy, (a Dukedom,) Papiſts.
Saxony, (a Dukedom,) Papiſts and Lutherans.
Scotland, (a Kingdom,) Preſbyterians; Epiſcopalians tolerated.
Siberia (Part of the Ruſſian Empire,) Greeks and Armenians.
Sicily, (an Iſland,) Papiſts.
Spain, (a Kingdom,) Papiſts.
Sweden, (a Kingdom,) Lutherans.
Switzerland Cantons, (a Republic,) ſix Proteſtants to ſeven Papiſts.
Tartary, (an Empire, partly in Europe,) Armenians, Mahometans, and Greeks.
Triers, (an Archbiſhopric,) Papiſts.
Turkey, (an Empire, partly in Europe,) Mahometans, Jews, and Chriſtians.
Tuſcany, (a Dukedom,) Papiſts.
Venice, (a Republic,) Papiſts, Greeks, and Jews.

Of CURIOSITY *in* KNOWLEDGE.

1. TOO great a *Curioſity* to know involves Men in many *Doubts* and *Anxieties*.

2. *Curioſity* in ſearching into *Things*, beyond the Limits of Mankind's Abilities, wraps their Minds in the *Miſts* of *Error*.

3. *Knowledge*, in many *Caſes*, does but ſhew us our *Ignorance* and entangle and perplex the Mind: *For our real Knowledge reaches no farther than we have Ideas*.

4. We often ſee the *Effect*, but cannot arrive at the *Cauſe*.

5. *Learning* is like a *River* riſing far in the Land, where its *Head* is eaſy to view; but, as it proceeds in its *Courſe*, it grows wider and wider, between the Banks, the farther you follow it; till it falls into the *boundleſs Ocean* of *Inquiry*, and is loſt to your Sight.

6. *Nature* may be ſounded in the *Shallows* of her *Revelations*; ſhe may, perhaps, be traced to her *ſecond Cauſes*; beyond which is Nothing but Doubts and Difficulties, that *involve* us in Darkneſs and Error.

7. When we *converſe* about *Things* that we can examine, and have Power to find out the *Cauſes*, there is ſome *Certainty* and *Pleaſure*; but, when we enter upon *Metaphyſics* and *unrevealed Divinity*, we are launched into a *boundleſs Ocean* that our Reaſon cannot fathom.

8. *Much* is acquired by diligent Study; but far more is *unattainable* that lies beyond the Reach of Man's ſhort Life.

9. Aſſuming a Knowledge in *all Things* appears like *Arrogance*.

10. It is *unwiſe* to be *aſhamed* of *Ignorance*, where Knowledge is not attainable.

11. The Vanity of attempting to know what lies out of the Reach of *human Capacity* plunges Men into a Gulph of Ignorance.

12. It is *no Shame* not to know what is *impoſſible* to be known.

13. Many expoſe their *Folly* and *Ignorance* by an obſtinate *Defence* of *that*, which, with more Prudence, they might confeſs themſelves ignorant of. One will inform us of the *Place* of *Paradiſe*; another of the *Place* of a *local Hell*; another pretends to know the *Situation* of *Heaven*, and what it is, as *perfectly* as if he had come from being a Viſiter there, and had been much acquainted with *every Sphere*.

14. To *Ovid* the torrid Zone was *uninhabitable*, *(non eſt habitabilis æſtu,)* by Reaſon of its exceſſive Heat; though Time and Experience has evinced it to be quite otherwiſe.

15. St. *Auguſtine* rejected the Notion of the *Antipodes*, as improbable and impoſſible, though to us Nothing is *more certain*, and Experience has evinced it. So that every Age confutes *old* Errors, and begets *new* Ones.

16. It is evident, from many *Cauſes* and *Effects*, that a *large Curioſity* in Knowledge, like *Dædalus*'s *Labyrinth*, entangles Men the more, the farther they enter: For, the *nearer* we approach the Sun, the *blinder* we are.

17. He that goes the *fartheſt* into unattainable *Enquiries* clothes himſelf with Vanity, Vexation, and Diſappointment.

18. It is eſteemed a *Queſtion* of no ſmall Importance, whether the *Progreſs of Learning* has done more *Hurt* or *Good* in the World: Whether more Queſtions have not been *ſtarted*, by the Schools, than reſolved: As if *Learning* ſhould not proceed, or *Queſtions* not be aſked, becauſe of theſe Queſtions. This *Trifling* with Knowledge only ſhews that Men loſe their Time, in *cavilling* it away about *Toys*, when they ſhould purſue the more valuable *Prize* to be run for.

19. Men are drawn *back* by trifling Arguments, rather than carried *forward* to high Speculations worthy their Attainment. Such *Diſquiſitions* breed *Diſquiet* and *Diſorder* of Mind, ſince better Things are more eaſily and ſafely known or attained.

20. How happy the ruſtic Life! free from ſuch vain Purſuits.

21. He who looks *forward* not beyond the *Plough* and *Scythe* has a more *quiet* and *undivided* Mind than the *caſuiſtical Enquirer*.

22. Man may labour for Inſtruction and Improvement where *Prudence* commands him; but, if he ſoars where *Reaſon* loſeth Sight, he ſhould content himſelf to retire with *Admiration*.

23. It is Folly for Men to rack their Brains, and put their *Underſtandings* on *Tenter-Hooks*, to comprehend unprofitable *Impoſſibilities*.

24. If we are *allowed* to know what is *diſcoverable*, to what Purpoſe is it to purſue what is hid from us, and impoſſible to be known.

25. To know what can be known is *ſufficient*, without having farther Curioſity.

REMARK. *The human Being is limited in its Organs of Senſation and Powers of Reflection, and therefore the human Underſtanding cannot go beyond its own Ideas and Faculties, in the Requirements of human Knowledge, and thoſe Conceptions, for which,*

which, in the utmoſt Extent, it was made. In other Orbs there, doubtleſs, are Beings, formed with different Organs and Faculties (which is not above human Underſtanding, rationally to ſuppoſe) able to comprehend Plans of Ideas of a greater Extent than thoſe comprehended by the ſhort-ſighted human Species: Each Orb, probably, containing Beings, enlarged or diminiſhed in their Capacities according to the different Magnitudes of thoſe Orbs in which they reſide. The different Primaries *and their* Satellites, (viz. *different* Earths *and their* Moons,) *infallibly revolving round the Sun, as their common Center, (as is proved by Obſervation by good Glaſſes,) carry their reſpective Inhabitants, (all Nature being filled with Life and its Principles,) but of what Ranks or Kinds of Being the human Mind can have no Idea, as to which its Faculties are not adapted, and therefore ſuch an Enquiry it would be in vain to purſue. So, likewiſe, the Syſtems of Worlds, lying out of our View, at or beyond the fixed Stars, contain Beings of various Ranks, whether purely* intellectual, *or compoſed of* Body *and* Intellect, *it is equally* impoſſible *for us to comprehend. Though we are totally ignorant of the Nature of God, or of his infinite Being and Perfections, yet we are certain of his Being, which we infer from his wonderful Works created: And, in the ſame Manner, we can ſafely infer the Exiſtence of different Species of ſuperior Beings, from the certain Idea we have of God's Exiſtence, and the Variety of his Creatures we ſee made below us. If we ſet one Step farther in human Knowledge, (as the Ultimate of all,) we can ſee* Worlds *coming into, and going out of, Exiſtence; as* Animals *and* Vegetables *come forth and periſh here, in Succeſſion, according to the ſagacious Plans in the* infinite divine Mind; *though we are totally ignorant of the Nature of what theſe remote Beings and Worlds are or will be.* PALLADIUM-AUTHOR.

PART II.

ANSWERS *to all the* ÆNIGMAS *in laſt Year's* PALLADIUM.

† I. A SIGN.
II. An EAGLE.
III. A PAIR of PATTENS.
IV. LIGHT.
V. ACE of TRUMPS.
VI. ECHO.
VII. A CYPHER.
Prize. A WAX-CANDLE.

All the ÆNIGMAS, *in laſt Year's* PALLADIUM, *anſwered by Mr.* Iſaac Gumley, (*Author of* Ruralindus *to* Ruralinda *in that* Palladium.)

Lovely Ruralinda, I. *To be ſet by a Maſter of Muſic.*

CELESTIAL Nymph, my Soul inſpire,
O *Phœbus*, lend thy golden Lyre,
While I expreſs how I admire
The Charms of Ruralinda.
Oh! could I like old Homer ſing,
Or mount with Milton's tow'ring Wing,
Fit Metaphors I then might bring
To paint my Ruralinda.

II.

Like radiant Comets are her Eyes,
Which gild, at Night, the darkſome Skies,
For all with Wonder and Surpriſe
Behold my Ruralinda.
To ſay her Cheeks excel the Roſe,
And Rubies do her Lips compoſe,
Will not my Vanity expoſe,
And injure Ruralinda.

III.

III.

Dame *Venus*, fam'd as Beauty's Queen,
Round whom each winning Grace is ſeen,
Is not more fair, or has a Mien
More grand than Ruralinda.
In ſhort, a Form completely gay,
Where all the youthful Graces play
To ſteal Beholders Hearts away,
Has lovely Ruralinda.

IV.

Whene'er ſhe ſweeps the ſounding Lyre,
The liſt'ning Swains around admire;
Old *Orpheus* ſhe'd with Joy inſpire,
So plays my Ruralinda.
The bleating Flocks around her ſtand,
And own the Magic of her Hand;
Apollo, with his tuneful Band,
Can't equal Ruralinda.

V.

Minerva's fam'd for ſolid Senſe,
And *Mercury* for Eloquence;
But Heav'n does both theſe Charms diſpenſe
To lovely Ruralinda.
Let ſome be fam'd for Humour free,
And ſome extoll'd for Chaſtity,
Yet ev'ry Virtue ſhines in thee,
O charming Ruralinda.

VI.

Should Providence aſſign my Lot
To dwell beneath ſome humble Cot,
'Twould be a moſt enchanting Spot
If bleſt with Ruralinda:
The Flow'rs would brighter Hues diſplay,
The Birds would warble all the Day,
And tender Lambkins friſk and play
Round me and Ruralinda.

VII.

Beneath ſome deep embow'ring Shade,
For Reſt and Contemplation made,
ÆNIGMAS † and ſoft Tales I'd read
To lovely Ruralinda.
Then Riddles, with nice Art conceal'd,
Would ſoon unto us be reveal'd;
For *Oedipus* himſelf muſt yield
To lovely Ruralinda.

VIII.

Let Others boaſt of Wealth and Pow'r,
Thoſe glitt'ring Bawbles of an Hour;
On me, ye Heav'ns, your Bleſſings ſhow'r,
And give me Ruralinda!
Then, though the Sons of *Mammon* frown,
On them with Pity I'd look down,
Nay, ſcorn the Honours of a Crown,
To dwell with Ruralinda!

The PRIZE-ÆNIGMA *answered by Mr.* Gumley.

Addreſſed to Miſs **********, *who told him that Abſence would abate his Regard for her.*

O tell me no more, when you hear me complain,
That Abſence will help to diminiſh my Pain,
For now I experience a fatal Reverſe,
And ſuffer ſuch Tortures as None can rehearſe:
Yes, Abſence contributes to raiſe my Deſire,
And ſet all the tender Affections on Fire:
Thus, loud roaring Winds will the *Candle* eraſe,
Yet cauſe with freſh Fury the Furnace to blaze.

The PRIZE-ÆNIGMA *anſwered by Mr.* William Marſden.

NIGHT's *Candles* are burnt out, and jocund Day
Stands tiptoe on the miſty Mountains Tops. *Shakeſpear.*

All the ÆNIGMAS *anſwered by Mr.* Thomas Stuckfield, *of* Stepney.

The SPRING.

1. MILD is the Spring, ſerene the Air,
Hail, then, ſweet Month of May!
When Nature does her Charms prepare
To deck the vernal Day.

2. The *Sun* reſplendent from the Eaſt, 7. *alluding to a Cypher or Circle.*
Illumes the World below;
And *Echo* celebrates the Feaſt 6.
That Sound and Sight beſtow.

3. The ſoaring *Eagle*'s dreadful Voice 2.
The feather'd Race alarms,
Like *flying** Troops who ſhun the Noiſe **Jack.*
And horrid *Din** of Arms. **Drum.*

4. The blooming Maid, with ruſtic Song,
Now gambols on the Plain;
Without her *Pattens* friſks along 3.
To meet her loveſick Swain.

5. The warbling Songſters through the Grove
Their wintry Fears re-*Sign*; 1.
With raptur'd Joy and eager Love
Their Lays harmonious join,

The PRIZE-ÆNIGMA *anſwered by Mr.* William Pen, *of* Chalfont, Bucks.

A Pound of *Candles*, ſtole laſt Night,
Their full Weight had, yet were too light.

Mr. *W. Earl*, of *Frodſham*, anſwered all the *Ænigmas* ingeniouſly in Verſe. Mr. *Tom Truſtywell*, of *Nuneaton*, *Warwickſhire*, anſwered them in Verſification, but too ludicrouſly, diſguſtingly, and impurely, for Inſertion. Mr. *Stuckfield* anſwered the *Prize-Ænigma* in elegant Verſe; as did Mr. *J. Hunt*, of *Winſlow* School. Mr. *Joſeph Denton* anſwered all the *Ænigmas*, as did Mr. *Richard Dalton*. Mr. *Bayley*, of *Middleton*, anſwered the *Prize-Ænigma*, as he did all the *Ænigmas*, in Verſification. — We have not Room for all, and prefer the moſt ſuitable to our *Plan* and *Space*. The more uſeful, elegant, and ſtriking, the *Sentiments*, the better!

The PRIZE-ÆNIGMA *anſwered by Mr.* J. B. *of* Clemsford.

To the PALLADIUM-AUTHOR.

THOUGH, Sir, Ænigmas I'm unus'd to handle,
The Prize-Ænigma ſurely is a *Candle*,

Mr.

Mr. William Swift's *Anſwer.*

I did to th' Maid a *Candle* bring,
When ſhe cry'd out — Aye! that's the Thing!

The PRIZE-ÆNIGMA *anſwered by* Philo-Sophia.

WHEN Gumley's Muſe to Sophy did impart
Raptures of Joy that play'd about her Heart,
" O George, ſhe cry'd, thou haſt Sir Iſaac* read, **Newton's*
" But Iſaac Gumley captivates my Head! [*Philoſophy.*
" His *Candle*'s Rays ſo glaringly excite,
" I love to read him both by Day and Night!"

The PRIZE-ÆNIGMA *anſwered by Mr.* William Hurn, *of* Diſs,* Norfolk.
**On the Letter's Outſide, but no Place mentioned within.*

1. CALLIOPE, dear Maid, befriend me,
Haſte, Euterpe, from the Skies,
In Miltonic Strains attend me,
Let me claim the Laurel Prize!
2. Lovely Nymphs, replete with Graces,
Tell this ſimple Truth to all;
Candles emulate your Faces,
At the Play, the Rout, or Ball.

The PRIZE-ÆNIGMA *anſwered by the Rev.* Thomas Vaughan.

CANDLES of Wax or Tallow will conſume,
But Gumley's Light will Ages laſt to come.

The PRIZE-ÆNIGMA *anſwered by Miſs* Jenny Brown, *of* Newcaſtle.

THE blazing *Candles* plainly ſhew
Our Life thus waſting faſt;
Then teach us, Heav'n, ourſelves to know,
And think how ſoon † our laſt!
† *Like poor* G. Coughron.

The PRIZE-ÆNIGMA *anſwered by Mr.* J. Hunt, *junior*, *of* Winſlow *School.*

WHEN the Evening obſcures the dull Plains,
With Joy the Palladium I read;
Not a weariſome Hour now remains,
Nor a Wiſh can Enjoyment exceed.
There Inſtruction is join'd with Delight,
Each Page does Improvement inſpire;
I call for a *Candle* to light,
And the farther I read more admire!

Mr. *William Swift*, of *Stow*, anſwered all the *Ænigmas* in Verſe. *Gemini*, of *Morpeth*, anſwered all the *Ænigmas* and *Rebuſes* in Verſification, and propoſed new Ones. Mr. *Scott*, of *Cawthorne*, anſwered ſeveral of the *Ænigmas*. Mr. *George Perrot* anſwered moſt of the *Ænigmas*. Mr. *W. Marſden* anſwered 1. and 3. *Ænigmas*; Mr. *Hayes*, of *Frodſham*, 1. 2. 3. and *Prize*; Mr. *John Harriſon*, the ſame; Mr. *John Broadbent*, 1. 3. and *Prize*; and Mr. *Robert Todd*, of *Foreſthourn*, the *Prize*.

ANSWERS

ANSWERS *to the* QUERIES *in laſt Year's* PALLADIUM.

I. QUERY 235, *anſwered by* Nemo, *of* Newport, *a Friend to the Propoſer.*
HE ſays *Nihil.* We have received no other true Anſwer.

II. QUERY 236, *anſwered by* Gemini *of* Morpeth.
AS Son of the *firſt* Huſband he inherits by *Generation*; as Son of the *ſecond* he inherits by *Law*; and is therefore intitled to both Eſtates.
The *Propoſer*, of *Newport*, anſwered the ſame, without *Law* or *Reaſon* being all the Anſwers we received to this important *Queſtion.*

III. QUERY 237, *anſwered by* Idem Nemo, *of* Newport.
HE ſays, *illic, iſtoc.*

IV. QUERY 238, *anſwered by Mr.* J. Hunt, *of* Winſlow *School.*
THE Cauſe of the *Northern Lights* is from a thin, nitrous, *ſulphureous*, Vapour, raiſed in our Atmoſphere, conſiderably higher than the Clouds. This Vapour by Fermentation taking Fire, the Exploſion of one Portion of it kindles the next, ſo the Flaſhes (of the *Aurora Borealis* or Northern Lights) ſucceed one another, till the whole Quantity of Vapour within their Reach is ſet on Fire. See *Rowning's Natural Philoſophy*, P. 158.
Gemini, of *Morpeth*, ſays, that the *Northern* Lights proceed from the Vapours *aſcending* by Exhalation.

V. QUERY 239, *anſwered by Mr.* John Harriſon, *of* Helſby, Cheſhire.
THE Exploſion occaſioned a *Vacuum* in the *external* Air, and therefore the *internal* Air, in the adjacent Room, muſt break the Glaſs to reſtore it to a Balance, or a *Plenum*; for Air preſſes equally on all Hands. Who remarks, that if Gunpowder were kept in upper Rooms, inſtead of the ill Cuſtom of keeping it in Cellars, it could do but little Damage when it met with an Accident by Fire; as then it would only carry away the *Roof* of the Houſe and all above it, and would be the Means of ſaving many Lives.
Gemini, of *Morpeth*, attributes the Glaſs falling *outwards* to the *Reverberation* of the Shock; but then the *Cauſe* muſt be as above deſcribed by Mr. *Harriſon*, from the *Vacuum.*

VI. QUERY 240, *anſwered by* Gemini, *of* Morpeth.
NO Doubt but the Ark of the Lord was burnt with the Temple; which may be a ſufficient Reaſon for the extreme Grief of the *Jews*; for, as *Joſephus* emphatically expreſſes it, *they lifted up their Heads and wept.*

ANSWERS *to the* REBUSES *in laſt Year's* PALLADIUM.

I. HOREHOUND.	III. BATH.	V. HOMER.
II. GIBSON.	IV. DURHAM.	VI. TYBURN.

A general Anſwer to the REBUSES, *by Mr.* Iſaac Gumley, *of* Counteſthorp.

WHENE'ER I deceive the dear Maiden I love,
The Sun ſhall grow dark, and the Earth ceaſe to move;
The Minſter of *Durham* ſhall vaniſh in Air, 4.
And Rogues* without Force ſhall to *Tyburn* repair; 6.
**Libellers, and little* Tom Pats, *who work in the Dark.*

Green Wormwood and *Horehound* ſhall grow in the Ocean, 1.
And *Gibſon* ſhall walk, yet be void of all Motion; 2.
The Ladies ſhall grow quite averſe to the *Bed*, *Or Bath*, 3.
And *Homer*'s ſweet Verſes ſhall ceaſe to be read. 5.

An Anſwer to all the REBUSES, *by Mr.* Thomas Stuckfield, *of* Stepney.

1. MISS *Gibſon*'s bright Charms the Northumbrian warms, 2.
And *Tyburn* awaits all the libelling Crew; 6.
At *Bath*, or the Play, in ſplendid Array, 3.
The Ladies their innocent Pleaſures purſue.
2. The Herb, call'd *Horehound*, does in Virtues abound, 1.
Old *Homer* ſurpaſſes all Poets in Fame, 5.
And *Durham*'s fine Town is held in Renown; 4.
Theſe Anſwers, if right, let the next Year proclaim.

The REBUSES *anſwered, in an Acroſtic, by Mr.* William Hurn, *of* Diſs.
Addreſſed to Miſs Polly Stow.

P–olly, haſte, and ſee me here
A–ll the Rebuſes declare.
L–ovely Sophy knows *Horehound*; } 1.
L–ady *Gibſon* oft is found } 2.
A–t the *Bath* in Pleaſure's Round. } 3.
D–*urham*, worthy Seat of Kings! 4.
I–o's Beauty *Homer* ſings. 5.
U–ntil *Tyburn* † change its Name 6.
M–ay th' Initials merit *Fame*.* **Anſwer to the 24th Queſtion.*
† *Or* Paddington, *the Country-Seat of the Workers in Darkneſs.*

The REBUSES *anſwered by Miſs* Jenny Brown, *of* Newcaſtle.

1. SWEET purling Brooks and tow'ring Trees,
On *Durham*'s healthful Plains, 4.
Miſs *Gibſon* charm, as ſhe agrees, 2.
Who *Tyburn*'s ‡ Seat diſdains. 6.
2. She Books like *Homer* reads with Care, 5.
Each Hour ſhe makes a Treaſure;
Knowledge of *Herbs* ſhe has her Share, *Alluding to Horehound*, 1.
At *Bath* takes little Pleaſure. 3.
‡ *A Place not agreeable to* Some.

Several of the REBUSES *anſwered by Mr.* John Bailey, *of* Middleton, Yorkſhire.

LAST Summer at *Bath* I did Miſs *Gibſon* ſee, 3. 2.
With ſome Ladies of *Durham*, as briſk as a Bee; 4.
They aſk'd what I thought of the libelling Crew:
Thoſe Gentlemen, Ladies, (their Writings will ſhew,)
At *Tyburn*, I think, if I do not miſtake, 6.
As *eminent Authors*, a Figure will make. 5.

Mr. Swift, *of* Stow, *anſwered the 1ſt and 6th* REBUSES *thus, in his humble Addreſs to* Sophia Witchit.

AH! Sophy, Sophy! — have you done
Taking freſh *Horehound*, Shame to ſhun? 1.
Don't Culpepper ſay, Sage is the Way
Eſteem to gain and Worth diſplay?
Methinks I could an Herb reveal,
(Of ſov'reign Uſe as Butcher's Steel,)

Which

Which would remove your daily Plaints,
And place your Name among the Saints,
Cure all your Friends, the Libellers,
Exalt your Fame as high as theirs,
When to their *Country-Seat* they go, 6.
Or where this precious Plant does grow;
Which I'll reveal without a Fee;—
The Secret is, H, E, M, P.

Mr. Swift *anſwers the* 2*d and* 3*d* REBUS *thus.*

MISS *Gibſon*'s the Lady for whom I appear; 2.
I wiſh her good Health, and a Thouſand a Year!
Bath, I find, is the Place where the Ladies attend, 3.
To ſeek out for Health, or to find out a Friend.

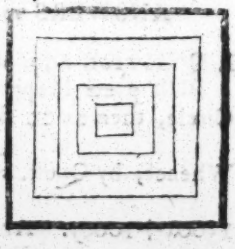
Mr. *Swift* anſwered the other *Rebuſes* very *rebuſmatically.*

Mr. *Giles Lacey* ſent us his verſified Anſwer to all the *Rebuſes*; Mr. *R. Dalton* ſent Anſwers to ſome; Mr. *Tom Truſtywell*, of *Nuneaton*, *Warwickſhire*, anſwered the 5th; Mr. *Joſeph Denton* anſwered all; Mr. *Earl*, of *Frodſham*, *Cheſhire*, anſwered 1. 3. 4. 5. 6. Mr. *Scot* anſwered 1. 3. 4. 5. 6. Mr. *George Perrot* anſwered moſt; Mr. *W. Marſden*, all; Mr. *Hayes*, of *Frodſham*, all but the 2d; Mr. *J. Harriſon*, the ſame; and Mr. *John Broadbent*, 1. 4. 5.

ANSWERS *to the* PARADOXES *in laſt Year's* PALLADIUM.

I. PARADOX *anſwered by Mr.* W. Earl, *of* Frodſham, Cheſhire.

HE firſt takes Something above a ſquare Yard of *one Stone*, or of flat Pavement, and divides it into 5 Squares; the four outſide with a Border to each, and the inſide Stone a complete Square; allowing for the Waſte of cutting, he *joins* them together again, ſo as to make up the ſquare Yard.



Mr. *W. Hayes*, of *Frodſham*, anſwered it in the ſame Manner, like the Figure annexed; as did Mr. *Harriſon*.

Mr. *Richard Dalton* goes to work with only 4 inſtead of 5 ſquare Stones, (by an algebraic Proceſs,) and therefore miſſes the Mark.

Mr. *Penn*, of *Chalfont*, alſo paves with 4 inſtead of 5 Squares, (the Conditions propoſed,) and, not diſtinguiſhing between Right and Wrong in paving a ſquare Yard with the *proper Number* of Stones, fails in his Anſwer, thus:

Your Deſign to complete, and your Art to decide,
Four Stones muſt be juſt half as thick as they're wide;
Two of theſe when plac'd *edgeways*, and two when plac'd *flat*,
Will anſwer the Purpoſe, I think, very pat.

Gemini, of *Morpeth*, anſwers it thus:

One-fifth of a Yard makes the Side of each Stone,
Then place them together, — the Work will be done.

II. PARADOX *anſwered by Miſs* Jenny Brown, *of* Newcaſtle.

IT is *evident* that the Ship, after having ſailed 150 Miles *North*, muſt have arrived at the Pole; from whence ſhe could ſail no other Way but *South*. But, the *Sum* of the Diſtances run being equal to her Diſtance from the Place firſt ſailed from, ſhe muſt have continued her Courſe upon the ſame Meridian, and conſequently be in the oppoſite Longitude, *viz.* 50° Eaſt; hence the Latitude ſailed to is eaſily found to be 84° 49′, and that ſailed from 87° 30′.

Gemini ſays the ſame; as did Mr. *Hayes* and Mr. *Harriſon*.

III. PARADOX *answered by Miſs* Jenny Brown.

THE Earth's a Globe you knew before;
Its *Center* will the *Place* explore.

Gemini anſwered it the ſame; as did Mr. *Hayes* of *Frodſham*, Mr. *J. Harriſon*, and Mr *John Clark*, of *Great Ryle, Northumberland*.

Mr. *William Penn* ſays,

A *Wonder* indeed! as it needs muſt be ſaid,
With the Head o'er the Heels, and the Heels o'er the Head!

Mr. *Richard Dalton* ſays, if a Man ſtand near the Sea or a River, ſtooping with his Head downwards, and another ſtand looking into the Sea or River, he will ſee the former as if his Head and Heels were both upward, by *reflected Viſion*.

Mr. *Hunt* anſwered it.

IV. *and* V. PARADOXES *anſwered by Miſs* Jenny Brown.

YESTERDAY's gone, and now no more, 5.
But yet we had it here;
Tomorrow ſo will ſoon paſs o'er, 4.
And ſo glides on each Year.

Mr. Thomas Truſtywell, *of* Nuneaton, *anſwered the* 4*th* PARADOX *thus*.

TOMORROW will anſwer the Paradox clear,
'Tis always *to come*, and yet always is *here*.

Mr. *Thomas Stuckfield*, Mr. *John Bailey*, Mr. *William Earl*, and Miſs *Brown*, anſwered the 4th and 5th *Paradoxes*. *Gemini*, of *Morpeth*, anſwered the 4th.

ANSWERS *to the* QUESTIONS *in laſt Year's* PALLADIUM.

I. QUESTION 499, *anſwered by Mr.* William Hayes, *of* Frodſham, Cheſhire.

PUT $y =$ Perpendicular of the Triangle, $4x =$ Diameter of the inſcribed Circle, then $2x =$ Baſe, and $x+y =$ Hypothenuſe, (by Property of the $\triangle$).

Whence, by Queſt. $\overline{x+y} \times 2xy : 3x+2y :: 500 : 1$. Th. $2x^2 + 2y^2x = 1500x+1000y$. And (by 47. *e.* 1.) $\overline{x+y}^2 = 4x^2+y^2$; whence, $2xy=3x^2$, and $2y=3x$, conſ. $x = \frac{2}{3}y$. Subſtitute this Value of x, in the 1ſt Eq. and $\frac{8}{9}y^3+\frac{4}{3}y^3 = 200y$. Whence, $y = 30$, the Perp. $2x = \frac{4}{3}y = 40$=Baſe, $x+y = 50$, the Hypothenuſe, and Area $= 600$. W. W. R.

Mr. *Harriſon*, of *Helſby, Cheſhire*, conciſely anſwers it by a *Figure* and correct Proceſs. Mr. *Lamb*, at *Aldborough*, near *Hull*, accurately anſwered it by a few Equations; as did Mr. *John Eadon*, of *Sheffield* Free-School. Mr. *Richard Dalton*, of *Pool, Carmarthen*, anſwered it in a correct and ſhort Manner; as did Mr. *Thomas Watkins*, of *Briſtol*.

Mr. J. Broadbent, *of* Saddleworth, Yorkſhire, *anſwers it thus in his MS. Book.*

HE diſcovers and ſays it is *evident*, that a Triangle's Sides are as 3, 4, and 5, *ſimilar* to the required one. Who puts $x =$ Baſe; when it will follow that the 3 Sides will be as x, $\frac{3x}{4}$, and $\frac{5x}{4}$. Put $y =$ the Diameter of the inſcribed Circle, and $m = 500$. Then, by Queſtion,

	1	$m : 1 :: \frac{15x^3}{16} : \frac{12x}{4}$,	Whence, $2y = x = 40$,
	2	$1 : 2 :: y : x$, where $x = 2y$.	the Base; $\frac{3x}{4} = 30$,
By 1st	3	$3m = \frac{15x^2}{16}$.	the Perp. $\frac{5x}{4} = 50$,
3 by Subn	4	$3m = \frac{15y^2}{4}$, whence $y = \sqrt{\frac{12m}{15}} = 20$.	the Hyp. and Area $= x \times \frac{3x}{8} = 600$, *req.*

Mr. *J. B. Lee* and Mr. *W. Sedgwick*, of Mr. *Hardy*'s School, at *Cottingham*, make the same Observation, and solve this *Question* in the same easy and short Method.

Mr. *Ralph Lowes*, of *Cramlington*, solved it; also Mr. *Matthewson*, of *Fatfield, Durham*; Mr. *Perrot*; Mr. *Robert Abbott*, junior, of *Preston*; Mr. *Robinson*; Mr. *Scott*; Mr. *Kidd*, of *Berwick-Hill*; Mr. *John Wilson*, late Pupil to Mr. *Lamb*, but now at Mr. *Goforth*'s, Attorney, at *Kingston upon Hull*; Mr. *Wadforth*; Mr. *Shadgett*; Mr. *Fatherly*; Mr. *Elliot*, of *Mythom-Bridge*; Mr. *J. Gibson*, a Drummer in the 68th Regiment; *Gemini*; Mr. *Gumley*, the Proposer; and Mr. *James*, of *Stoke-Bishop*; *analytically* and *numerically* confirming each other's well-wrought Solutions.

Mr. *Denton*, of *Holly-Moor*, (like Mr. *Broadbent*,) answers this *Question* by *Ratios*; who says, as there is Nothing given but Ratios, consequently the Sides will arise in *arithmetic Progression*; and putting $3x$, $4x$, and $5x$, for the Sides, as $60x^3 : 12x :: 500 : 1$; whence $x = 10$. and the Sides $= 30$, 40, and 50, respectively, *required*. — Mr. *Penn* answered it by another Method.

II. QUESTION 500, *answered by Mr.* John Matthewson, *of* Fatfield, Durham.

GIVEN, $\left\{\begin{array}{l} x+x^2y^2 = 66 = a \\ y+y^2z^2 = 404 = b \\ z+z^2x^2 = 105 = c \end{array}\right\}$ By 1st, $x^2 = \frac{a-y}{y^2}$; by 3d, $x^2 = \frac{c-z}{z^2}$; th. $x = \sqrt{\frac{c-z}{z^2}}$. Now, z must be such a Number, as, taken from 105 and divided by the Square of the same Number, the Quotient must be a square Number. By a Trial or two, z is found $= 5$, and $x = 2$; now, by the 2d Equation, $y+25y^2 = 404$; whence $y = \sqrt{\frac{404}{25} + \frac{1}{2500}} : -\frac{1}{50} = 4$.

W. W. R.

Mr. *Joseph James* answered it in a similar Manner, by Substitution; as also did *Gemini*, Mr. *W. Hayes*, Mr. *Fatherly*, Mr. *Shadgett*, Mr. *Wadforth*, Mr. *J. Wilson* of *Hull*, Mr. *Kidd*, Mr. *Robinson*, Mr. *John Clark* of *Great Ryle*, Mr. *Lee* and Mr. *Sedgwick* of *Cottingham* School, Mr. *Abbot*, Mr. *Dalton*, Mr. *Lamb*, Mr. *Harrison*, Mr. *Broadbent*, Mr. *Penn*, Mr. *Gibson*, Drummer, Mr. *Perrot*, Mr. *Lowes*, and Mr. *Gumley*, the Proposer; making their proper Observations on the Properties of the Equations.

REMARK *by the* PALLADIUM-AUTHOR. — By the first Equation, $\frac{\sqrt{66-x}}{x} = y$; 2d, $\frac{\sqrt{404-y}}{y} = z$; and 3d, $\frac{\sqrt{105-z}}{z} = x$, where $66 - x$, $404 - y$, and $105 - z$, are all square Numbers; because $\frac{66-x}{xx} = yy$, $\frac{404-y}{yy} = zz$, $\frac{105-z}{zz} = xx$, are all *Squares*; therefore,

x,

x, y, and z, in the 1ſt, 2d, and 3d, reduced Equations, are *eaſily* determined in the Diviſors, $\sqrt{66-x}$, $\sqrt{404-y}$, $\sqrt{105-z}$, all ſquare Roots in whole Numbers; admitting of $x=2$, $y=4$, and $z=5$, and no other, at Sight; each Number giving a *Proof* of the other.

Mr. *Todd*, of *Foreſt-Bourn*, anſwered it; as did Mr. *Watkins*, of *Briſtol*.

III. QUESTION 501, *anſwered by the Propoſer*, *Mr.* Gumley.

THE Numbers to this *Queſtion* ſhould have been given, 481, 9371, 195223, and 9401. Then take the 2d Equation from the 4th, and we have $2x+2y=30$; therefore, $x+y=15$. By Subſtitution, the 1ſt becomes $v^2+15+z^2=481$; th. $v^2+z^2=466$; and the 4th Equation becomes $v^3+15+z^3=9401$; th. $v^3+z^3=9386$. By a few Trials, z is found $=5$; put this in the laſt Equation, and we have $v^3+125=9386$; whence, $v^3=9261$, and $v=21$. Now we have $x+y=15$; and $x^2+y^2=1170$. But $x=15-y$ $=\sqrt{117-y^2}$; th. by Tranſpoſition, and comp. $\square$, y is found $=6$, and $x=9$.

Thus, a *Wife*, O ye Swains, is the Object requir'd,
By many deſpis'd, and by many admir'd!
He that has got a good one is bleſs'd with a Treaſure,
But who has a bad one is plagu'd beyond Meaſure.

Mr. *Watkins*, of *Briſtol*, anſwered it.

The ſame anſwered by Mr. John Broadbent, *of* Saddleworth, Yorkſhire.

PUT 481, 9371, 195223, and 9401, for the given Numbers, thoſe printed being a Miſtake. It is evident, then, from the 2d and 4th given Equations, that $x+y=15$, which Value put in the 1ſt and 2d Equations; $v^2+z^2=466=a$; and $v^3+z^3=9371+15=9386=b$; from the former of theſe, $v=\sqrt{a-z^2}$; this Value put in the latter Equation, we have $\sqrt{a-z^2}\,|^3+z^3=b$; where, by Trial, $z=5$; whence $v=21$. Theſe Values, put in the 1ſt and 3d, give $x+y=481-v^2-z^2=15$, (put which $=m$,) and $x^2+y^2=195223-v^4-z^4=117$, (put which $=n$;) then, from the former of theſe, $x=m-y$; which Value being put in the latter Equation, gives $m^2-2my+2y^2=n$, or $2y^2-2my=n-m^2$; whence, by comp. $\square$ and Extraction, $y=\frac{m}{2}\pm\sqrt{\frac{m^2}{4}-54}=6$ or 9, and the Reſt follow.

I find the Propoſer in Want of a Wife,
To take off the Bitters, and ſweeten his Life;
But be wary, my Friend, leſt this prove the Caſe,
The Remedy ſought happen worſe than Diſeaſe!
What Matches we ſee 'twixt the young and the old!
If both ſhould be young, *hot Love is ſoon cold.*
Sweets, once grown familiar, warm Ardour abates,
And daily Poſſeſſion *Indiff'rence* creates.
Imprudence in either will damp Love's Deſires,
And, often repeated, extinguiſh its Fires!
Though your Heart be ſo fond that you cannot take Reſt,
And your *Flame*, like a *Taper*, keep ſcorching your Breaſt,
Though your *Lamp*'s full of Oil, as you ſeem to give Proof,
If the Flame be not *pure*, — *you will ſoon have enough!*

Mr. *Ralph Lowes*, of *Cramlington*, anſwers this *Queſtion*, *univerſally*, thus. Subtract the 2d Equation from the laſt, and we have $2x+2y=d-b$; therefore,

$x+y$

$x+y=\frac{d-b}{2}$, which put $=m$; alſo, $v+z=s$, and $vz=p$; then, $v^2+z^2=a-m$, or $s^2-2p=a-m$, and $s^3-3ps=b+m$; whence we get $p=\frac{s^2-a-m}{2}=\frac{s^3-b-m}{3s}$, or, reduced, $3as-3ms-s^3=2b+2m$. Whence Anſwers to this *Queſtion*, in all poſſible Caſes, may be had.

Mr. *Harriſon* alſo anſwered it generally, as did Mr. *Dalton*, (*correcting the Data*;) alſo Mr. *Abbot*; Mr. *Robinſon*, by a final Equation of the 6th, 4th, 3d, and 2d, Powers; Mr. *Shadgett*, by a final Equation of the 3d and 1ſt Powers; who corrects the Numbers to 320, 93223, 195223, and 9540, (different to Mr. *Gumley*'s Correction,) and yet anſwers the *Queſtion* right.

Mr. *W. Hayes* gave a *general* Anſwer.

Gemini, by a Proceſs and the Numbers given, determines the Word to be *Love*, by $z=20$, $v=11$, $x=14$, and $y=5$. *How can this be?*

Mr. *Joſeph James* anſwered it in a general and ſhort Way, by a final Equation of the 3d and 1ſt Power, correcting the *Data*. Who remarks,

O how happy is his Life,
Who has got a bleſſed Wife.

IV. QUESTION 502, *anſwered by Mr.* James Lamb, *at* Aldborough, *near* Hull.

PUT $s=2979.2349125$, $a=2150.42$ ſolid Inches in a Buſhel, $D=18.5$ Inches, the Diameter, $\frac{1}{r}=$ *Ratio* of the Caps, $p=.7854$; then, $s-a=$ the whole Buſhel Cap; $\frac{s-a}{r}=$ the Half-Buſhel Cap: Then, by ſimilar Solids, $s-a : D^3 :: \frac{s-a}{r} : \left|\frac{D^3 \times \frac{s-a}{r}}{s-a}\right|^{\frac{1}{3}}=$ the Diameter of the Half-Buſhel *univerſally*, which, in the preſent Caſe, $=12.8272$ Inches $=d$; then, $\frac{s}{2}-\frac{s+a}{r}=$ the Content of the cylindrical Part of the *Half-Buſhel*, whence $\frac{rs+2a-2s}{p\times 2rd^2}=9.3895$ Inches, its Depth. W. W. R.

Meſſrs J. B. Lee's *and* W. Sedgwick's *Solution.*

THE Inches in a Statute-Buſhel $=2150.4$, which taken from the given Inches leaves 828.835, nearly, for the Cope or Cone of the ſaid Buſhel. It is known that a Statute-Buſhel is $18\frac{1}{2}$ Inches in Diameter, and 8 Inches in Depth. Alſo the *Cap* of the Half-Buſhel is to be $\frac{1}{3}$ of the *Cap* of the Buſhel, by *Queſt.* Now, as ſimilar Solids are as the *Cubes* of their ſimilar Sides, th. as 828.835 : $\overline{18.5}|^3$ :: 276.278 : Cube of the Half-Buſhel's Diameter, whoſe Cube-Root [*ſhewing the proper and neceſſary Uſe of the Cube-Root*] $=12.82717$, for the Half-Buſhel's Diameter; whence its Depth $=9.389$ Inches. W. W. R.

Mr. *Shadgett*, by another elegant and ſhort Proceſs, finds the Half-Buſhel's Diameter $=12.82718$, and its Depth $=9.38927$, *confirming* the Truth of the former Solution, and of one another, being both maſterly Anſwers.

Mr. *Scott*, from other *Data*, finds the Diameter $=12.8276$, and the Depth 8.3197; Mr. *Robinſon*, the Diameter $=12.828$ and Depth 8.319; Mr. *Dalton*,

ton, the Diameter 12.82147 and Depth 8.3284 Inches; Mr. *Wilſon*, of *Hull*, the Diameter 12.827 and Depth 9.3897, (the laſt agreeing with the firſt Numbers;) Mr. *Denton*, the Diameter 12.826 and Depth 8.322; Mr. *James*, (by an *elaborate* Proceſs,) from other *Data*, Something different. Mr. *Wadforth* makes the Diameter 12.827 and Depth 9 3890, (agreeing with the firſt Numbers;) Mr. *W. Hayes*, the Diameter 12.826 and Depth 9.3909 *&c. Gemini*, 12.82 and 9.399 *&c.* Mr. *Harriſon*, 12.826 and 9.3909; Mr. *Lowes*, different.

Mr. *Broadbent* anſwers it thus. — Put $a = 1489.61745625 =$ Half the Content of the Buſhel; put $b = 828.8097125 =$ the *Cope* of the whole Buſhel; put $m = .7854$. Let $x =$ the Diameter of the *required* Half-Buſhel, and $y =$ the Depth thereof; then, by *Queſt.* $x^2my + x^3m = a$, and $1 : 3 :: \frac{x^3m}{b} : b$; whence $x = \sqrt{\frac{3b}{m}} = 12.82711$, the Diameter; this Value, put in the *former* Equation, gives $y = \frac{a - \frac{x^3m}{b}}{x^2m} = 9.3894$, Depth, agreeing with the *firſt* Numbers.

Mr. *Matthewſon* makes the Diameter $= 12.827$ and Depth $= 8.32057$, from other *Data*: Mr. *Watkins*, Something different.

V. QUESTION 503, *anſwered by Mr.* J. Gibſon, *Drummer in the 68th Regiment.*

PUT $a = 25000$ Chains in the *given Area*; $x =$ the Length; then, $\frac{a}{x} =$ the Breadth of the purchaſed Land; but, by *Queſt.* $5x + \frac{8a}{x} =$ a *Minimum.* In Fluxions, $5\dot{x} - \frac{8a\dot{x}}{xx} = 0$, or $5 = \frac{8a}{xx}$; whence $xx = \frac{8a}{5}$, and $x = \sqrt{40000} = 200$ Chains in Length, and $\frac{a}{x} = 125$ Chains in Breadth; hence, $5 \times 200 + 8 \times 125 = 2000 l.$ Purchaſe, the *leaſt Money, required.*

Meſſrs *J. B. Lee* and *W. Sedgwick* correctly ſolved it in a ſimilar Manner.

Gemini, Mr. *Harriſon*, Mr. *Lowes*, Mr. *Hayes*, Mr. *Denton*, Mr. *Dalton*, Mr. *Robinſon*, Mr. *Scott*, Mr. *Lamb*, Mr. *Shadgett*, Mr. *Kidd*, Mr. *Fatherly*, Mr. *Elliot*, and Mr. *Matthewſon*, anſwered it in a ſimilar and correct Method. Mr. *J. Eadon*, junior, of *Sheffield*, ſolved it.

VI. QUESTION 504, *anſwered by the Propoſer*, *Mr.* John Shadgett, *of* Roſs.

PUT $x =$ the Length in Feet; then will $\frac{x}{2} =$ the Depth, and $\frac{x}{\sqrt{2}} =$ the Breadth: Hence, $x \times \frac{x}{2} \times \frac{x}{2\sqrt{2}} = 250$, by *Queſt.* Multiply both Sides by $2\sqrt{2}$, and we ſhall have $x^3 = 500\sqrt{2}$; whence $x = \sqrt[3]{500 \times 2^{\frac{1}{2}}} = 8.905$ Feet $=$ the Length; whence the Depth $= 4.4545$, and the Breadth $= 6.2996$ Feet. W. W. R.

It was anſwered in a ſimilar Manner by Mr. *Perrot*, Mr. *Lamb*, Mr. *John Clark*, Mr. *Kidd*, Mr. *Watkins*, Mr. *Fatherly*, Mr. *Elliot*, Mr. *Dalton*, Mr. *Scott*, Mr. *Robinſon*, Mr. *Wilſon*, Mr. *Denton*, Mr. *James*, Mr. *Wadforth*, Mr. *William Hayes*, Mr. *Lowes*, Mr. *Harriſon*, *Gemini*, Mr. *Gibſon*, Drummer, Mr. *Broadbent*, Mr. *Gumley*, Mr. *Matthewſon*, Mr. *Todd*, and Mr. *Marſden*, whoſe Solutions were all *maſterly* performed.

VII.

VII. QUESTION 505, *answered by Mr.* John Wadforth, *of* Aldborough.

BY the *Palladium-Author*'s *Arithmetic*, P. 82. an Ounce of Gold is worth 3.9*l.* and an Ounce of Silver 5*s.* then, by *Ward*'s *Introduction*, a cubic Inch of Standard Gold weighs 9.962620 Ounces, and a cubic Inch of Standard Silver weighs 5.556769 Ounces.

For the Gold Cylinder.

$\frac{5000l.}{3.9} = 1282.05128$ Ounces of Gold, and $\frac{1282.05128}{9.962625} = 128.686092$ cubic Inches, the Content of the Cylinder. For the Diameter put a; then, as $1 : 2 :: x : 2x$, the Length; let $a = .7854$; then $x \times x \times a \times 2x = 2ax^3 = 128.686092$; whence $x = \sqrt[3]{\frac{128.686092}{2a}} = 4.345$ Inches, the *Diameter*, and $2x = 8.686$ Inches, the Length.

For the Silver Cylinder.

$\frac{£.5000 \times 20}{5} = 200$ Ounces of Silver, and $\frac{20000}{5.556769} = 3599.213859$ cubic Inches, the *Content* of the Cylinder. Let y the Diameter; then, as $1 : 2 :: 2y :$ the Length; and $y \times y \times a \times 2y = 2ay^3 = 3599.213859$; whence $y = \sqrt[3]{\frac{3599.213859}{2a}} = 13.183$, the *Diameter*, and $2y = 26.366$, the *Length*.

For the Cone.

The Content of the Gold Cylinder, 128.686092, added to the Content of the Silver Cylinder, 3599.213859, the Sum is 3727.899951 Inches, the Content of the Cone. Put z for the Diameter; then, as $2 : 5 :: z : \frac{5z}{2}$, the Length, and $z \times z \times a = az^2$, the Content of the Base; then $az^2 \times \frac{5z}{6} = \frac{5az^3}{6} = 3727.899951$, and $5az^3 = 22367.399706$; whence $z = \sqrt[3]{\frac{22367.399706}{5a}} = 17.858$ Inches, the Diameter, and $\frac{5z}{2} = 44.645$ Inches, the Height; the Circumference $= 56.10269$; the slant Height $= 45.529$; then, $z \times z \times a = 250.47047$ Inches, the Area of the Base, and $\frac{45.529 \times 56.10269}{2} = 1277.14975$ Inches, the Curve's Surface; then, $250.47047 + 1277.14975 = 1527.62022$ Inches, the whole Surface. W.W.R.

Mr. *Watkins*, of *Briſtol*, anſwered the ſame.

Mr. *W. Hayes* ſhortly makes the Diameter of the Gold Cylinder 4.3409 Inches; the Diameter of the Silver Cylinder, 13.188, and its Height $= 26.37$; alſo 3727.694 *&c.* $=$ ſolid Inches of the Gold and Silver melted together; whence he deduces the Radius of that Cone's Baſe $= 8.929$ Inches, and the Cone's Surface, excluding that of its Baſe, $= 1277.1165$, confirming Mr. *Wadforth*'s Numbers, above, in the *exemplary* Solution.

Our ingenious Correſpondent, Mr. *Joſeph James*, by the ſame Way of accurate Computation, finds the Breadth of the Bag of Silver $= 13.183445$ Inches

ches = the Diameter of the Silver Cylinder; alſo 4.3431, the Breadth of the Gold Bag, or Diameter of the Gold Cylinder, their Lengths being 26.366890 and 8.6862 Inches reſpectively; and, when both Bodies are melted together, will be 3727.89995218 ſolid Inches; whence he finds 17.8587 Inches, the Cone's Diameter, 44.6469, its Altitude, its curved Surface 1277.3271, and ſuperficial Content = 1527.7472 Inches; to an *amazing Co-incidence* with Mr. *Wadforth*'s Numbers! proving the correct Truth of each other; but, without theſe *numerical Compariſons* and *Concluſions*, no Solutions can be depended on for their Proceſs and Preference; the agreeing Numbers in Concluſion being a Confirmation of the Truth of the *analytical* Method of each Solution. Some Correſpondents Numbers (whoſe Names we do not mention) prove not their Operations to be true.

This *Queſtion* was anſwered methodically and correctly by Mr. *Lowes*, Mr. *Harriſon*, *Gemini*, and Mr. *Lamb*.

Mr. *Watkins*'s Solution was given from the *Practical Arithmetician*, and is an amazingly correct one, in its Coincidence with Mr. *James*'s, Mr. *Wadforth*'s, and with other Solutions, the correcteſt of any.

VIII. QUESTION 506, *anſwered by Mr.* James Lamb, *of* Aldborough, *near* Hull.

BY the firſt Equation, $x = a + z - y$; by the ſecond, $x = \frac{c+zy}{z+y}$; therefore $\frac{c+zy}{z+y} = a+z-y$. Put $s = z+y$, and $d = z-y$; theſe put in the laſt Equation, it becomes $\frac{4c+s-d^2}{4s} = a+d$. Hence, $d^2 + 4ds = 4c+s^2-4as$, and by comp. □ and Extraction, $d = \sqrt{4c+5s^2-4as} : -2d$. By Trial find ſuch a Number as the Value under the radical Sign ſhall be a Square, which will be when $s = 56$, then $d = 2$; hence $x = 22$, $y = 27$, and $z = 29$. W. W. R.

This *Queſtion* was anſwered in a ſimilar Manner, and truly, by Mr *Clark*, Mr. *Dalton*, Mr. *James*, Mr. *Broadbent*, Mr. *Todd*, Mr. *Wadforth*, Mr. *Watkins*, and Meſſrs *Lee* and *Sedgwick*.

IX. QUESTION 507, *anſwered by Mr.* John Matthewſon, *of* Fatfield, Durham.

PUT $y = x^x$, $y^3 = x^{3x}$, and $y^5 = x^{5x}$; then, by 47. *e.* 1, $y^{10} - y^6 = y^2$; which $\div y^2$ becomes $y^8 - y^4 = 1$. By comp. □ and Extraction, $y^4 = \sqrt{1.25} + .5$; whence $y = \sqrt[4]{.5 + \sqrt{1.25}} = 1.278$, the Perpendicular, and $y^3 = 1.43448578$ Baſe; alſo $y^5 = 1.8245695$, the Hypothenuſe, and Area = .8089[illegible] W. W. R.

It was alſo [illegible]red in a maſterly, ſimilar, and correct, Manner, by Mr. *Perrott*, Mr. *Robinſon*, *Gemini*, Mr. *Lamb*, Mr. *Dalton*, Mr. *Fatberly*, Mr. *Kidd*, Mr. *Watkins*, Mr. *Clark*, Mr. *Harriſon*, Mr. *Lowes*, and Mr. *James*.

Mr. *William Hayes*, ſubſtituting as above, comes to $y^2 + y^6 = y^{10}$, and $y^8 - y^4 = 1$; whence he determines $y = \frac{1}{2} + \sqrt{1\frac{1}{4}} = 1.127834$ &c. $x^{3x} = 1.4346$ &c. $x^{5x} = 1.82487$, and Area = .80901695 &c.

Meſſrs *Lee* and *Sedgwick* confirm the Truth of theſe Numbers by their accurate Solution in the ſame Method.

X.

X. QUESTION 508, *anſwered by Mr.* Joſeph James, *of* Stoke-Biſhop, *near* Briſtol.

PUT x = what the Cloth was ſold for; now 100—20 = 80; therefore, 80 : 100 :: x : 25; hence x = 20*l.* what it was ſold for, being £. 11.25 = 11*l.* 5*s.* under its juſt Value.

Mr. *Dalton* anſwers it thus. —— As 100*l.* : 20*l.* :: 25*l.* : 5*l.* = what he loſt by the Cloth; therefore it was ſold for 20*l.*

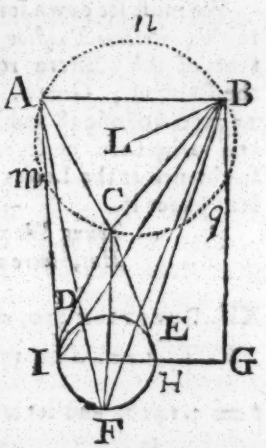
Mr. *Marſden*'s *Anſwer.* —— As 100*l.* : 20*l.* :: 25 : 5*l.* loſt by the Sale of the Cloth; therefore it was ſold for 20*l.* —— Again, as 100 : 25 :: 25 : 6*l.* 5*s.* the Money expected to be gained by the Sale; therefore 5+25+6*l.* 5*s.* = 36*l.* 5*s.* is what the Cloth coſt.

Gemini's *Solution* is the ſame, except in the latter Part; who proportions thus; as 100 : 125 : 31*l.* 5*s.* ſelling 11*l.* 5*s.* below his Expectation.

Mr. *Lamb*'s *Solution* is exactly the ſame, and ſo are alſo Mr. *Watkins*'s and Meſſrs *Lee* and *Sedgwick*'s.

XI. QUESTION 509, *anſwered by Mr.* John Harriſon, *of* Helſby, Cheſhire.

LET ABC, DIFE, repreſent the Ciſtern, whoſe Top, ABC, is triangular, and Bottom, DIFE, round; then it is evident, the *longeſt* Line that can be drawn is BI. Let fall the Perpendicular BG on IH produced; then will IG = IH+HG; draw LB to the Center of the △ ABC, which will be = 90.235, and (*per* 21. *Em.* 2.) $\sqrt{IB^2-IG^2}$ = BG = 40.72646. Suppoſe a Circle deſcribed about the Points ACB to complete the Ciſtern into the *Fruſtum* of a Cone, A*n*C*m*B*q*, *&c.* whoſe perpendicular Height is BG, the Diameter of the Circle A*n*B*q* *&c.* is found 115.47, and the Solidity of the *Fruſtum* 267235.68 ſolid Inches. Now, if, from the Solidity of the *Fruſtum*, there be taken the three equal Segments, A*m*CDC*qn*E, the Remainder will be the Solidity of the Ciſtern. Then, by *Fletcher*'s *Menſuration*, P. 256, the Solidity of one of the Segments is = 31819.264, and



267235.68 — 31819.264 × 3 = 171777.9 Inches; whence the Solidity of the Ciſtern = 609.14 Ale Gallons. W. W. R.

Mr. *Hayes* anſwers it by the ſame Figure and Numbers, as if one had ſeen the other's Solution; but Mr. *Harriſon*'s Figure and Solution is rather the plaineſt and beſt explained of the two Anſwers.

No other Solutions bear any Competition with theſe for Truth and juſt Method of Solution, excepting one given by Mr. *Lamb*, who is very elaborate, and determines, with great Labour and Accuracy, a great many of the Ciſtern's Properties; but, as they are not explained by a Figure, nor will numerically compare with other Solutions, all deviating widely from each other, we cannot pretend (without more Conſideration than we have now Time for) to determine with any Certainty about his Concluſions. He finally determines the ſolid Content of the *Ciſtern* in Queſtion to be 172346.968558181 ſolid Inches, = 611.15946 Ale Gallons; which is pretty near Mr. *Harriſon*'s and Mr. *Hayes*'s Quantity. But this Solution is ſo long and ſo difficult that we cannot ſpeak with Certainty about it. It refers to *Emerſon*'s *Geometry* at ſetting out, to find the Circle's Diameter circumſcribing the triangular Top of the Ciſtern, then the Depth thereof; then, in Order to find the Ciſtern's Content, he next finds the Content of 3 *Hoofs*, the *Sections* whereof are *Hyperbolas*, (*a fine Piece of Work cut out!*) the Baſe of each = 100, and the Height of the circular

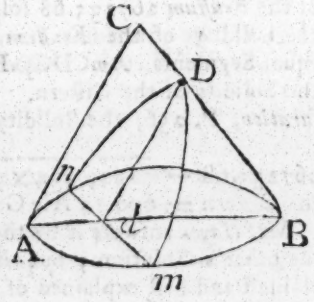
Segment $= \frac{115.47}{4} = 28.8675$; these *Hoofs* being taken from the Content of the conic *Fruſtum*, leaving the Content of the Ciſtern. But the Diſtance between the Baſe of the Hoof and its perpendicular Height muſt be next found, the Length of the hyperbolic Section, (referring to *Hutton*'s *Menſuration*,) the tranſverſe and conjugate Axes found; the Diſtance between the Ordinate and Center, by Means of *hyperbolic Log.* of a long Term or Number, then found and multiplied into a large natural Number, producing the Area of the *hyperbolic Section* 2585.0333841496; then the Area of the *circular* Segment, *(referring to the Palladium Author junior's Arithmetic;)* then the Content of the Hoof (by *Hutton*'s *Menſuration)* is found to be 31596.06303727, which × d by 3 gives 94788.18911181, the Content of the 3 equal Hoofs; which, taken from the ſaid Content of the conic *Fruſtum*, 267135.15767, elaborately leaves 172346.96558181 ſolid Inches, and Gallons, *Ale Meaſure*, as before, for the perplexed Content of the ſaid Ciſtern; like Mr. *Sharp*'s *Geometry* improved, unfit for *practical Purpoſe*.

We muſt ſet down ſome of our Correſpondents Concluſions, in their *Anſwers* to this *intricate Queſtion*, for Others to judge of. Mr. *Robinſon* finds the Content of the Ciſtern required = 550.879 Ale Gallons; Mr. *Lowes*, 510.08, the Content; *Gemini*, of *Morpeth*, the ſame; Mr. *Scott* makes the Content 155290.60806948 cubic Inches; Mr. *Dalton*, 538⅛ Gallons; ſo uncertain and various are the ſeveral Anſwers. And ſome Correſpondents appear to be frightened at the Looks of this *grim Queſtion!* ſo as to ſhudder or be quite ſilent about it.

Young Ward, *the Collector, who lives at* Holbeach,
Has, more than old Ward, *been to Gaugers a Match!*

XII. QUESTION 510, *anſwered by Mr.* James Lamb, *at* Aldborough, *near* Hull.

PUT $a = Dd = 37.5$, $b = nd = 25.9807$, $p = 3.1416$, and let $x = Bd$; then, $\frac{b^2}{x} = Ad$, and $x + \frac{b^2}{x} = AB$, the Diameter of the Cone's Baſe, and $p \times x + \frac{b^2}{x} =$ the Circumference thereof. The Triangles BdD and BAC are ſimilar; hence, $x : a :: x + \frac{b^2}{x} : \frac{ax^2 + ab^2}{x^2} = AC$, the



ſlant Side; then $\frac{p}{2} \times x + \frac{b^2}{2x} \times \frac{ax^2 + ab^2}{x^2} = \frac{p \times ax^4 + 2ab^2x^2 + ab^4}{2x^3} =$ the Curve Surface, a *Minimum*. In Fluxions, $\frac{p \times 2ax^6\dot{x} - 4ab^2x^4\dot{x} - 6ab^4x^2\dot{x}}{4x^6} = 0$. Whence, by Reduction, $x = b\sqrt{3} = 45$ nearly, and Ad (in the *Figure*) $= 15$; hence the Diameter $= 60$, the ſlant Side 50, and Perpendidular 40. W. W. R.

Mr. *Robinſon* the Propoſer's Solution is exactly the ſame in Concluſion, and the Proceſs ſimilar, as was alſo Meſſrs *Lee* and *Sedgwick*'s

The ſame *Queſtion* was *correctly* anſwered by Mr. *Harriſon* and by Mr. *Hayes*, with a ſimilar Figure to the above; as alſo by *Gemini*, by a correct Proceſs and Numbers. Mr. *Kidd* anſwered it. Mr. *Elliot* has conſtructed this *Queſtion*, and given an algebraic Solution.

XIII.

XIII. QUESTION 511, is left for Mr. *Johnſon* himſelf to give a Solution to, we not having received one thereto from any Correſpondent.

XIV. QUESTION 512, *anſwered by Mr.* William Hayes, *of* Frodſham, Cheſhire.

FIRST, find the Solidity of the Piece = 53200 Inches = 1760.63 *&c.* lb. Avoirdupoiſe, (P. 341, *Robertſon's Menſuration,*) then the Center of Gravity is eaſily determined = 16.7025 Feet from the leſs End and 8.2975 from the greater; whence, 25 : 1760.6327 :: 16.7020 : 1167.27872 lb. ſuſtained by the *Prop* at the greater End. Therefore, $\frac{1}{2}$ Diff. of Weight ſuſtained by the Props at the greater and leſs End = 286.96236 lb. Conſequently, if the whole Weight be taken off the End, by raiſing it 90°, it muſt be raiſed 22° 7′ 32″ to loſe 286.96 *&c.* lb. Therefore, if the Prop at the greater End be lengthened, or the Prop at the leſs End be ſhortened 9.416 Feet, each Prop will ſuſtain an equal Weight. W. W. R.

Gemini, by another Deduction, makes 2.3081 the Diſtance of the Center of Gravity removed to make the Props bear alike; and that, as the Ends muſt be equally diſtant from this Center, 9.4455—2.3081 = 7.1374, which × d by 2 = 14.2748, and $\sqrt{25^2 - 14.2748^2} = 20.5238$, he makes the Length of the Prop at the *leſs* End to be ſhortened, that each End may bear alike.

Mr. *Harriſon*, by Mr. *Hayes*'s Method and Principles, makes exactly the ſame Concluſions as he has done above. Mr. *Lowes* makes 1101.4 the Weight of the greater End, and 668.83 that of the leſs, and 2.3 *&c.* the Diſtance removed from the Center of Gravity, when the Weight is equal: Who finds that Center to be 15.55 *&c.* from the leſs End, and 9.44 from the other, and determines that 20.5, the Length of the Prop, at the leſs End, muſt be made ſhorter.

XV. QUESTION 513, *anſwered by the Propoſer, Mr.* Johnſon, *of* Hull.

LET $r = 1$ the Radius, V = the natural verſed Sine of 70°, $s = 176$, and $p = 142000$. Then the Side, oppoſite the given Angle, will be $\frac{s}{4} \pm \sqrt{\frac{s^2}{16} - \frac{p \times 2r - V}{s}} = 73.210165 = b$. Now, put $s - b = d$, and the other two Sides will be the two Roots of this Equation, *viz.* $x = \frac{d}{2} \pm \sqrt{\frac{d^2}{4} - \frac{p}{b}}$; the greater Root, in the preſent Caſe, being = 77.88673, and the leſs = 24.903104, which are the Sides of the Triangle ſought; their Sum being = 175.99999 *&c.* extremely near 176, the given Sum of the Sides.

Note, One or other of the two Roots of the above Equations ſuits all Caſes that can happen in ſuch Queſtions.

Meſſrs *Lee* and *Sedgwick* ſolved it. Mr. *Watkins* alſo gave an accurate Method of Solution, and correct Numbers, in the Concluſion; as did Mr. *Kidd*, Mr. *Perrot*, and *Gemini*. Mr. *Gibſon*, Drummer, gave the Proceſs without Numbers, affording no Compariſon, and conſequently no Proof. Mr. *Abbot* gave a Proceſs and true Numbers; as did Mr. *James*, Mr. *Hayes*, Mr. *Harriſon*, Mr. *Robinſon*, Mr. *Lamb*, Mr. *Lowes*, and Mr. *Dalton*; all performed in a maſterly Manner. Mr. *Eadon*, jun. ſent us an elaborate and correct Solution.

XVI. QUESTION 514, *anſwered by Mr.* Thomas Robinſon, *of* Biddick.

PUT x and y the Sine and Coſine of the Latitude, q and p the Coſines of the Hour-Angles to Noon, m and n the Sines of the Sun's Altitude at the firſt and

and ſecond Obſervations, w and v the Sine and Coſine of the Sun's Declination, and Radius $= 1$. Then, by *Spheries*,

$$\left.\begin{matrix} qyv+wx=m \\ pyv+wx=n \end{matrix}\right\} \text{Therefore } yv=\frac{n-m}{p-q}=s;\ wx=\frac{pm-qn}{p-q}=k.$$

Alſo, $y^2v^2=s^2$, and $y^2=\frac{s^2}{v^2}$; whence $\sqrt{1-y^2}\times\sqrt{1-v^2}=k$, and

$1-y^2-v^2+y^2v^2=k^2$; that is, $1+s^2-v^2-\frac{s^2}{v^2}=k^2$, (put $l=1+s^2-k^2$;) whence, $v^4-lv^2=-s^2$, and, by comp. □ and Extraction, $v=\sqrt{\pm\frac{l}{2}+\sqrt{\frac{l^2}{4}-s^2}}=.86751=60^\circ\ 10'$, the Complement of the Sun's Declination; whence the *Declination* 29° 50′, an *Impoſſibility!*

Thus Mr. *Michael Taylor* of *Marley-Hill*, the Propoſer, may ſee the *Fruits* of his propoſing Queſtions without duly examining them and ſolving them himſelf; inſtead of which we have neither received from him an Anſwer to this his own Queſtion, nor to any other Queſtion inſerted, this Year; as if he (appearing to be diſguſted) expected that, when he *does ſend Anſwers*, we could find Room in our *limited Palladium* for all the *voluminous* Productions (Others as well as his own) that are ſent us; which can only admit of our *reſpectful* Notice according to their different Merits.

Meſſrs *Lee* and *Sedgwick* ſay that this Queſtion amounts to this. Given two Altitudes of the Sun or of a Star, and the Times of Obſervation, to find the Declination and Latitude, according to *Emerſon*'s *Algebra*, *Prob.* 155, *P.* 444. They have made a due Subſtitution, and purſued the Solution to a final Equation, as follows.

Put $x=$ Coſ. Diſ. between ⊙ or ✱'s polar Diſt. and Comp. Lat. $c=$ Coſ. Zen. Diſt. at the ſecond Obſervation, $f=$ Coſ. Zen. Diſt. at the firſt Obſervation, $b=$ Coſ. of the angular Diſtance from the Meridian at the ſecond Obſervation, $d=$ Coſ. of the angular Diſtance from the Meridian at the firſt Obſervation, $y=$ Coſ. of the Sum of the Sun or Star's polar Diſt. and Comp. Lat. which y they exterminated by referring to *Emerſon*'s *Trigonometry*, iii. 42. Cor. 1. whereby $x-y:2::x-c:1-b$, and $x-y:2::x-f:1-d$; whence, $x-c:1-b::x-f:1-d$. Th. $x-dx-c+cd=x-f-bx+bf$, and $bx-dx=c-f+bf-cd$; whence $x=\frac{bf-cd+c-f}{b-d}$. Alſo, $1-b\times x-y=2x-2c$, or $by-y=x+bx-2c$, and $y=\frac{x+bx-2c}{b-1}=\frac{2c}{1-b}-\frac{1+b}{1-b}x=\frac{bf-cd+f-c}{b-d}$. But as no Numbers are found, (like Mr. *Robinſon*'s,) the *Conſiſtency* or *Inconſiſtency* of Solution is not known. Nor is any *Solution* of Value without it be reduced to Numbers; which we have ſo often expreſſed to little Purpoſe, as our Admonition is but ſeldom attended to. It is Time thrown away to ſend a Solution *without Numbers*, which are the *Proof*, not only of the *Anſwer*, but of the Performer's Ability and Reputation. It is better to ſend *no Solution*, than to ſend one *without Numbers* to prove it.

XVII.

XVII. QUESTION 515, *answered by Mr.* Richard Dalton, *of* Pool.

PUT $40 = a$, $\frac{40}{2} = 20 = b$, $40 - b = 34 = c$. It is evident that one Half of the Cask must be a Cylinder, and the other Half a Hemispheroid. Therefore, by a known Theorem, $\frac{2a^2 + c^2 \times \frac{b}{3} + ba^2}{294} = 207\frac{2}{3}$ Gallons, which will be found the most capacious of any Cask under the given Circumstances.

REMARK *by the* PALLADIUM-AUTHOR. — We are of Opinion that, as a *Sphere* is the most *capacious* of all Bodies under the same Superficies, the *Staves*, therefore, of the two Half-Casks will probably be Arches of the *same* or *different* Circles, as a *Trial*, by the Method of *Fluxions*, will quickly determine. But, as our Correspondents seem to be afraid of taking that Trouble from the Scarcity of Solutions sent us to this *Question*, (we having received only one incorrect *fluxional* Solution, that makes the Content of the two Half-Casks an *Absurdity*, or 1.631 Gallons,) we must be *more cautious* of inserting *Questions* sent us without their Solutions; unless we take upon us the Trouble of solving all *Questions* ourselves, which would be beside our present Purpose and Plan.

XVIII. QUESTION 516, *answered by Mr.* Robinson, *of* Biddick.

GIVEN $y^4 = \frac{x^{12}}{\overline{3a - 2x}^8}$; by Extraction, $y = \frac{x^3}{\overline{3a - 2x}^2}$. (Why *Latin*, with *Redundancy*, Mr. *Rowe?*) Th. $y\dot{x} = \frac{x^3\dot{x}}{3a - 2x}$ = the *Fluxion* of the Area of the Curve, whose *Fluent* $= \frac{x^2}{8} + \frac{9ax}{12} + \frac{81a^2x - 81a^3}{12} \times 2.30258 \text{ Log. } \overline{2x - 3a}^2$. *(Quære.)* W. W. R.

Mr. *Rowe*, the Proposer, sent us no *Solution* to his *own Question*, (nor yet to any one *Question* this Year,) but left it for Others to resolve. Though he often makes *Objections* to what Others perform, he has been seen to be very often wrong himself, and yet (like disgusted *Eadon* about his *absurd* geometrical Progression Solution some Time since) would fling his Mistakes upon us when we have pointed them out. Though Mr. *Coughron* shewed Mr. *Rowe* his Error, *beyond a Contradiction*, in one Case, he had not *Candour* enough to own it, nor yet to thank Mr. *Coughron* (greatly his Superior in Judgement, and whose Notice of him did him Honour!) for informing him. The Matter is this. When some Persons have made a *Mistake*, they are willing to *vindicate Error* for Truth, at the Expence of Others, or at our Expence and the Credit of our Work; which is a *disingenuous* and *mean* Principle, unworthy of Countenance from any ingenuous and honest Mind, and therefore deserves Reproof. We give up all our own Mistakes to Correction very freely, *wherefoever* or *whensoever* they may be committed; since no *Might* can vindicate and support what of itself is not *right*; therefore the *best Truth* is to give up any *Mistake*, to have it established in Truth: Because there is more Honour in acknowledging, than in persisting in, *Error*, since no human Mind is perfect and infallible, nor expected to be so by the more *sensible* and *worthy* Part of the human Species. We would gladly ask Mr. *Rowe*, (who seems to be disgusted for no Reason,) what Sort of a Figure

gure many of his *Productions* would have made, (of the Truth of which he was ſo tenacious,) had they been inſerted? or how his *Latin* and other *Productions*, that are inſerted, would have appeared, had they been introduced as they were ſent? — We ſhall give the *Palladiums*, allotted to him, (left at Mr. *Cole*'s two Years unſent for,) to thoſe who are more attentive to *our Notice*, and who have Intereſt and Connections good enough to get themſelves *obeyed* from a known Part of the Earth above Ground.

Gemini *of* Morpeth's *Solution.*

EXTRACT the 4th Root, then $y = \frac{x^3}{\overline{3x-2a}^{\frac{1}{2}}}$; whence $y\dot{x} = \frac{x^3\dot{x}}{\overline{3x-2a}^{\frac{1}{2}}}$ is the Fluxion of the Area, from which take $x\dot{x}+3a\dot{x}$, that is $\frac{x^3\dot{x}}{\overline{3x-2a}^{\frac{1}{2}}} - x\dot{x}-3a\dot{x} = 27a^3 \times \frac{-a\dot{x}+x\dot{x}}{\overline{3x-2a}^{\frac{1}{2}}}$. This Expreſſion compared with the hyperbolic Logarithms, putting the *Fluent* thereof $=$ A, the Area of the curvilineal Space will be expreſſed by $A + \frac{a^2}{2} + 3ax$. W. W. R.

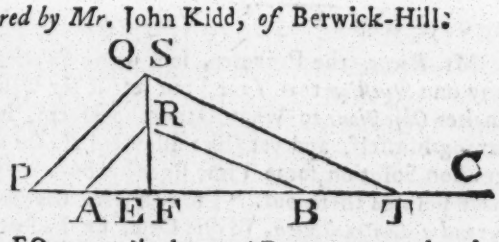
Anſwered by Mr. John Clark *of* Great Ryle.

By Reduction, $y = \frac{x^3}{\overline{3a-2x}^{\frac{1}{2}}}$; therefore $y\dot{x} = \frac{x^3\dot{x}}{\overline{3a-2x}^{\frac{1}{2}}}$, the Fluxion of the Area $= \frac{x^3\dot{x}}{9a^2} + \frac{12x^4\dot{x}}{81a^3} + \frac{108x^5\dot{x}}{729a^4} + \frac{864x^6\dot{x}}{6561a^5} + \frac{6480x^7\dot{x}}{59049a^6}$, &c. reduced to a Series. And, taking the *Fluent* of each Term, the *Fluent* will be $\frac{x^4}{36a^2} + \frac{12x^5}{405a^3} + \frac{108x^6}{4374a^4} + \frac{864x^7}{45927a^5} + \frac{6480x^8}{472392a^6}$, &c.

We received no other Anſwers.

XIX. QUESTION 517, *anſwered by Mr.* John Kidd, *of* Berwick-Hill.

A ſimilar Queſtion to this is in *Simpſon*'s *Algebra*, P. 339, from whence is derived the following Solution.



Conſtruction. Draw any right Line, ABC, in which take AE to EB in the given Ratio of the Segments of the Baſe; and make FQ perpendicular to AB, and $=$ to the given Height of the Δ; make alſo EC : AE :: BE : AE—BE; and, with the Radius CE, deſcribe the Circle ERS, and, from the Point R, where it interſects the Perpendicular FQ, draw RA and RB; and draw PQ and QF parallel to RA and RB, then will PQF be the Triangle required.

Domonſtration. By Conſtruction, as AR : BR :: AE : BE; therefore, by Reaſon of the parallel Lines, it will be as PQ : QT (:: RA : RB) :: AE : BE. And, for the ſame Reaſon, PF : TF :: AF : BF. Q. E. D.

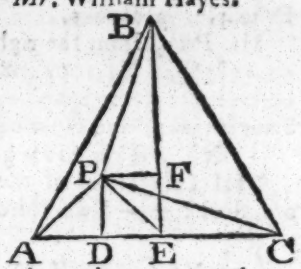
Method of Calculation. Aſſume AB$=$24, then BE$=$9, AF$=$18, BF$=$6, EA$=$15, and CE $(=\frac{AE \times BE}{EA-BE})=$22.5; whence RF$=\sqrt{EF \times \overline{CE+CF}}$ $=$11.22497216; from which PT$=$40.6237087704; PQ$=$21.5439749612; and

and TQ = 35.9066249358; the required Sides of the Triangle, true to the laſt Figure. *(Plaudite!)* *Q. E. I.*

Mr. *Elliot* alſo gave a Conſtruction and algebraic Solution, (referring to *Simpſon's Algebra*, P. 313,) agreeing with the above *Solution* in very near Numbers. *Gemini* gave a correct Conſtruction and numerical Solution in another maſterly Manner; as did Mr. *Dalton*, and Mr. *J. Eadon*, junior, Writing-Maſter, of *Sheffield*, very curiouſly, and in correct Numbers. — Theſe are all the conſtructed Solutions we received, according to the *Requiſition* in the *Queſtion*. —But we received analytical and numerical Anſwers (accurately and elegantly performed) from Mr. *Scott*, Mr. *Lowes*, Mr. *Lamb*, Mr. *Harriſon*, Mr. *Hayes*, Mr. *James*, Mr. *Robert Abbot* junior, Mr. *Wilſon*, Mr. *Denton*, Mr. *Gibſon*, Drummer, (whoſe able *mathematical Genius deſerves Encouragement*, and eſpecially as he writes a fluent and elegant Hand,) Mr. *Shadgett*, Mr. *Gumley*, (of general Talents for Ladies and Gentlemen,) Mr. *Fatherly*, Mr. *Perrott*, Mr. *Wadforth*, Mr. *Matthewſon*, Mr. *Watkins*, (to 8 Places of Decimals correctly,) and our old Friend Mr. *Robinſon*, whoſe Solutions are all correct, and performed in a workmanlike Manner.

XX. QUESTION 518, *anſwered by the Propoſer*, *Mr.* William Hayes.

IT ſhould have been called an *equilateral* (not *right-angled*) Triangle; then the Solution, from ſufficient *Data*, is as follows.



Let ABC repreſent the *equilateral* △, P the Point taken therein, and Lines drawn as *per* Figure. Put AP=20=a, BP=40=b, CP=50=c, and AE=EC=x; then, BE = $x\sqrt{3}$; and $2x$: $c+a$ :: $c-a$: $\frac{c^2-a^2}{2x}$ = 2DE. Th. DE = $\frac{m}{x}$ (putting m equal to $\frac{c^2-a^2}{4}$,) whence $x-\frac{m}{x}$ = AD. Therefore, $\sqrt{a^2+2m-x^2-\frac{m^2}{x^2}}$ = PD=FE, and $x\sqrt{3}-\sqrt{a^2+2m-x^2-\frac{m^2}{x^2}}$ = BF. Now $\frac{m^2}{x^2}+3x^2-2\sqrt{3}x\times\sqrt{a^2+2m-x^2-\frac{m^2}{x^2}}+a^2+2m-x^2-\frac{m^2}{x^2}$, (47. *e.* 1.) from whence, (putting $n=a^2+2m-b^2$,) by proper Subſtitution and Reduction,

$$x=\sqrt{\frac{12a^2+24m-4n}{32}+\sqrt{\frac{12a^2+24m-4n}{32}}:-\frac{12m^2+n^2}{16}}=29.93$$

=AE, whence AC=CB=BA=59.86, *required*.

REMARK *by the* PALLADIUM-AUTHOR. What has been *ſuppoſed*, by ſome of our other Correſpondents, that the given *angular* Diſtances *biſect* the Angles of the right-angled Triangle mentioned, (by no Means to be ſuppoſed,) would limit the *Queſtion*. For there have been former *Queſtions* in the *Palladium*, and alſo *Lady's Diary*, of the three angular Diſtances given from a Point within a common or right-angled Triangle, biſecting all thoſe Angles, to find the Sides of the Triangle; *abſtruſe* enough to reſolve.

Were the Caſe as ſome Correſpondents ſuppoſe, that the *ſhorteſt* Diſtance given biſects the Right-Angle, the Anſwer would be eaſy by *Conſtruction* and *plane Trigonometry*; ſince the *ſhorteſt* Diſtance might be firſt ſet off from the Right-Angle, equally divided; and then the *Interſections* marked by the Compaſſes, by the Extent of the *other* Diſtances ſet off, from the End of that ſhort-

eſt Diſtance, or given Point in the Triangle, upon the two Perpendiculars drawn from the Right-Angle, would form the Triangle *required*, calculated by Mr. *Matthewſon*, trigonometrically, to have its Sides = 51.5588, the Perpendicular 62.1005, the Baſe and Hypothenuſe 80.714. And Mr. *James* has calculated the Sides in other near Numbers. Mr. *Lamb* finds the Sides, from the *ſame* Principle, to be 51.5586, 40.5996, and 65.6248, (by ſome *Miſtake* in his Operation,) yet afterwards (by another *Miſtake*) infers that this *Queſtion* admits of as many Anſwers as *different* Points can be taken in the right-angled Triangle; whereas, by ſuppoſing the right-angled Triangle biſected by the ſhorteſt angular Diſtance, the *Point is evidently fixed to one Place.* — One of our ingenious Correſpondents conſtructed this *Queſtion univerſally*, (though not limited for Want of another *Datum:*) But his firſt drawing (as he did) GH = 40, at a *Random* Diſtance, on a Perpendicular and parallel to the Baſe, both Ways produced, and then from the End ‖ to the Right-Angle, ſetting off the ſhorteſt Diſtance therein, will not fix the Point within it, in his Random Conſtruction he propoſes; becauſe he might as well draw his Parallel HG at any othe Diſtance, as at the *Random* one he aſſumes without a Reaſon; rendering the Conſtruction a Random one, and conſequently his Numbers, derived from that Principle, erroneous.

Mr. *Penn*, from the right-angled biſected, readily finds the Sides to be 51.5587094, 62.1004508, and 80.714034, *correctly*. Mr. *Harriſon* juſtly obſerves, that the *Queſtion*, as propoſed, is *unlimited*, becauſe no *Ratio* of the Sides is given, and other equivalent *Data* are wanting.

XXI. QUESTION 519, *anſwered by Mr.* Robinſon, *of* Biddick.

THE Dimenſions of the *greateſt* Cone and Cylinder, inſcribed in a Spheroid, are theſe: —— Two-thirds of the Tranſverſe = the Cone's Altitude, and $\sqrt{\frac{8}{9}}$ × d Conjugate = Diameter, alſo $\sqrt{\frac{1}{3}}$ Tranſv. = Cylinder's Height, and $\sqrt{\frac{2}{3}}$ × d Conjugate = its Diameter. Put $b = 100$, x = Tranſv. $b-x$ = Conjugate; $p = .7854$; $\frac{2x}{3}$ = Cone's Alt. $\sqrt{\frac{8}{9}} \times b-x$ = its Diameter, and $\sqrt{\frac{1}{3}} \times x$ = Cylinder's Alt. $\sqrt{\frac{2}{3}} \times b-x$ = its Diameter; Th. $\frac{16b^2x-32bx^2+16x^3}{81} \times p$ = Cone's Solidity; $\frac{2b^2cx-4bcx^2+2cx^3}{3} \times p$ = Cylinder's Solidity; $c = \sqrt{\frac{1}{3}}$. $48b^2x^2-96bx^2+48x^3 = 108b^2cx-216bcx^2+108cx^3$, *per Queſt.* Whence $x^2-200x = -1000$; where $x = 100$, an *Impoſſibility!*

The above is the only Anſwer to this *Queſtion* that we received, our other Correſpondents being all frightened at it.

Mr. *Michael Taylor* again may ſee what is the Fruit of his ſending *impoſſible* and *abſurd Queſtions*, without giving any Anſwer himſelf thereto; as he has not, this Year, ſent any one Anſwer, to clear up his Pretenſions to Miſs *Hill*.

XXII. QUESTION 520, *anſwered by Mr.* Richard Dalton, *of* Pool.

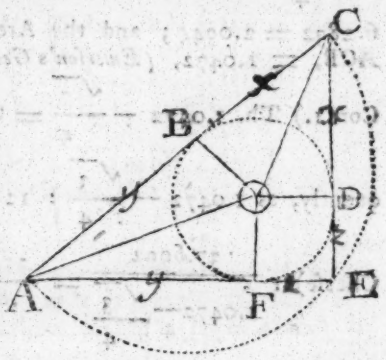
PUT x = Perpendicular, $x-z$ = Baſe, $x+z$ = Hypothenuſe, of the ſought Triangle; $a = 218.16$, and $c = .7854$; th. $c \times \overline{x+z}|^2$ = Area of the circumſcribing Circle, and $\frac{x^2-xz}{2}$ = that of the Triangle. And

$c \times$

$\sqrt{x+z}^2 \times \frac{x^2-xz}{z} = a$, *per Quest.* $\sqrt{x+z}^2 - \sqrt{x-z}^2 = x^2$, *per Fig.*

From the 2d Equation, $x = 4z$, which being put in the 1st and reduced, we have this simple Equation, $z = \sqrt{\frac{a}{25c-6}}^{\frac{1}{2}} = 4$.

Whence the Sides of the Triangle are 12, 16, and 20. W. W. R.



Mr. *Kidd* remarks on this *Question*, that the Area of any *right-angled Triangle* is equal to the Product of the two Parts of the Hypothenuse made by the Contact of the *inscribed Circle*, (a new discovered Property,) to which he has given this *Demonstration*. Putting z = Rad. = OF = OD = OB; x = CD = BC; y = AF = AB (in *Fig.*) $p = xy$, Area of $\triangle ACE = xz + z^2$. For, since $\angle FAB$ is bisected by AO, and the Side OB = OF, th. the right-angled $\triangle$s AOF and AOB are equal in all Respects. Also it may the same Way be proved, that the Triangles COB and COD are equal. Again, since AF = y, and the Radius = z, therefore the Area of ABOF = yz, and CBOD = xz, and the Area of the Square zz. Now, $\overline{x+y} \times z + zz$ = Area of the whole Triangle, $= xy = p = AB \times CB$; which, by putting $x+y = s$, becomes $sz+zz$. *vile* Q. E. D.

Mr. *Dalton* says that this *Question* is *over-limited*, by the Difference between the Area of the Triangle and inscribed Circle, which is an unnecessary *Datum*.

The *Proposer* solves it by a *Quadratic*; as do Mr. *Harrison* and Mr. *Wadsorth*. Mr. *J. Gibson*, Drummer, comes to a Conclusion of two final literal Equations; but we recommend to him, and all our Correspondents, to work all Equations out in Numbers, if they would have their Merits judged of. *Literal Arithmetic* is of no Value without *common Arithmetic* for applying it to Practice. Messrs *Lee* and *Sedgwick* solved it literally and numerically by a *Quadratic*. Mr. *Shadgett* solved it by a *Quadratic*, less entangled than some other Solutions. Mr. *Watkins* solved it by a Figure and correct Equations; Mr. *Matthewson* by a literal Process, in Steps, and a *Quadratic*; Mr. *James* by a *Quadratic*; Mr. *Lamb*, Mr. *Hayes*, and Mr. *Robinson*, the same; some of which Quadratics were lower, and more disentangled with known Quantities, than Others.

XXIII. QUESTION 511, *answered by Mr.* Ralph Lowes, *of* Cramlington, Northumberland.

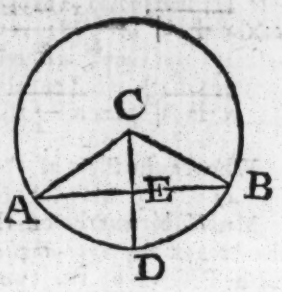
SINCE $\frac{1}{3}$ of 360° = 120°, let the Diameter = 1; then, by a Table of versed Sines, 1 : 5 :: $\frac{1}{2}$ (Sine 30°) : $\frac{1}{8}$ = versed Sine of the Segment, the Area of which is = .153546 *&c.* Th. as .153546 *&c.* : 12 lb. :: .7854 (the Area of a Circle whose Radius = 1) : 61.38 *&c.* lb. the whole Weight of the Cheese, that Mrs. *Margery* forgot. W. W. R.

Mr. *James*, on the same Principles, makes the Weight = 61.3806 lb. Mr. *Watkins* 61.3805 lb. Mr. *Harrison* 61.3793; *Gemini* 61.38; Mr. *Scott*, Mr. *Perrott*, and Mr. *Elliot*, the same; Mr. *John Eadon* junior, 61.31 *&c.* Messrs *Lee* and *Sedgwick* 61.38 lb. Mr. *Penn* 61 lb. 6 oz. 1.4658 dr. Mr. *Denton* 61.38063; Mr. *Lamb*, very carefully, from the *Practical Arithmetician*, 61.3962 lb. Weight. Mr. *Robinson* gave a literal but no numerical Answer.

Now $x+z \cdot y+z = xy + xz + yz + z^2 = 2A$ } Mr. F
but $xz + yz + z^2 = A$ } A = area of $\triangle AEC$.
Therefore $xy + \times \times \times = A$ Q. E.

Mr. Hayes *anſwers it thus.*

LET ABD repreſent the Segment left, and C the Center of the Cheeſe; then, if CB = 1, CE = ED $= \frac{1}{2}$, (*Emerſon*'s *Geom.* P. 41. Corol. 2.) whence EB $= \sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{2}$. Th. Area of the △ ACB $= \frac{\sqrt{3}}{4}$; alſo the Circumference ADB $= \frac{1}{3}$ of 6.2832 = 2.0944; and the Area of the *Sector*, ACB, = 1.0472, (*Emerſon*'s *Geom.* B. 4, P. 34, Cor. 1.) Th. $1.0472 - \frac{\sqrt{3}}{4}$ = the Area of the Segment AEBD. Conſequently, as $1.0472 - \frac{\sqrt{3}}{4}$: 12 lb. :: 3.1416 (the Area of the whole Cheeſe) : $\frac{37.6992}{1.0472 - \frac{\sqrt{3}}{4}} = \frac{37.6992}{.6142} = 61.3793$ lb. Weight, *required.*



XXIV. QUESTION 522, *anſwered by Mr.* W Hayes, *of* Frodſham, Cheſhire.

LET *a*, *e*, *i*, and *u*, repreſent the Values of the Letters Places in the Alphabet; then,

1. $a+e+i+u = 24$
2. $aeiu = 360$ } 2 ÷ 3d, $a = 6 = f$
3. $eiu = 60$ } 2 ÷ 4th, $i = 12 = m$
4. $aeu = 30$

Whence $e+u = 6$, and $eu = 5$, and th. $e-u = \sqrt{36-w} = 4$, whence $e = 5 = e$, and $u = 1 = a$, anſwering to the Word *FAME.*

Mr. *Robinſon* anſwered it in the ſame *methodical and ſhort Manner*; as did Mr. *Denton*, Mr. *Wilſon*, Mr. *Abbot*, Mr. *Fatherly*, Mr. *Perrott*, Mr. *J. Eadon* junior, Mr. *Gumley*, Mr. *Elliot*, Mr. *Broadbent* in his MS. Book, Mr. *Marſden*, *Gemini*, Mr. *Harriſon*, Mr. *James*, Mr. *Wadſorth*, Mr. *Gibſon*, Mr. *Shadgett*, Mr. *Matthewſon*, Mr. *Dalton*, Mr. *Lamb*, and Meſſrs *Lee* and *Sedgwick*.

Mr. *Watkins* elegantly ſolves it, and concludes thus.

Make FAME the Prize that *Britain*'s Sons acquire
In martial Deeds and Virtue's ſacred Fire;
Long may the Acts, recorded by her, ſtand,
T'invigorate each brave, each royal, Band,
Who firmly dare, in Freedom's glorious Cauſe,
To guard their Country and protect its Laws.

XXV. QUESTION 523, *anſwered by Mr.* Ralph Lowes, *of* Cramlington.

BY *Ward*, the Sides are a *Series* in arithmetical Progreſſion. Let *a* = the laſt or greateſt Side, *b* = the Length; then $\frac{1}{3}a^2b = 170$ 2-3ds = the Content of the Cone *required.*

Gemini *of* Morpeth's *Solution.*

.0625+.5625+1.5625+3.0625+5.0625+7.5625+10.5625+14.0625 = 42.5; which × d by 4 gives 170 Feet Content. But, by *Ward*, the Sides being a Series in arithmetical Progreſſion, let L = the laſt or greateſt Term, and N = the Length or Number of Terms; then $\frac{1}{3}$NLL $= \frac{32 \times 16}{3} = 170\frac{2}{3}$, the Content; being the common Theorem for a Cone.

XXVI.

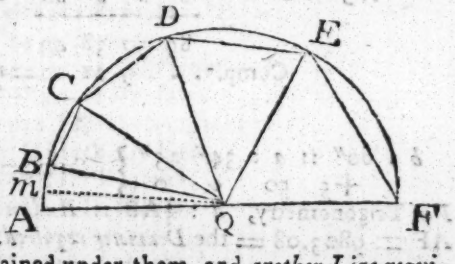
XXVI. QUESTION 524, *answered by* Gemini *of* Morpeth.

PUT $a = 20$, $m = .7854$, and $x =$ the Depth. Then, $a^2mx =$ the Preſſure on the Bottom; and $\frac{a^2mx^2}{2} =$ the Preſſure on the Sides. Th. $a^2mx = \frac{a^2mx^2}{4}$, or $x = 4$ Inches, the Depth, *required*.

Mr. *Lowes* ſolves it in the ſame Manner, and comes to the ſame Concluſion.

*** Our *capable* Correſpondent, Mr. *John Matthewſon*, of *Fatfield, Durham*, has been particularly curious in his *Solutions*, we had not Room for, except by a general Mention of them; having only Room for one or two *Pattern Solutions* of each Sort, the fitteſt for our Purpoſe, and ſuch as, on Compariſon with other *Solutions*, will ſtand the Teſt of Truth. — We ſhall be glad to receive more of Mr. *Johnſon*'s *Queſtions* and *Solutions*, Surveyor of Eſtates at *Hull*. — We deal much in *literal Arithmetic* this Year, but ſhall extend our Subjects into the more *diverſified Branches* of *Mathematics* in our next Year's *Palladium*, and recommend it to our Correſpondents to furniſh a *ſufficient Supply* of *various Matters in Science* accordingly. —— Were we to ſend the *laſt Sheet* of the *Palladium*, where requeſted, as ſoon as it is printed, it would be doing *Injuſtice* to the *Publiſher* and *Seller*, and like ſending a *ſingle Bullock* to Market before the *Herd*.

PRIZE-QUESTION *anſwered by Mr.* James Lamb, *at* Aldborough, *near* Hull.



IT is *demonſtrated* that a *Circle* is the moſt *capacious Figure*, or contains the greateſt Area, of all Others under the ſame Limits or Boundary. It will thence follow, that, to encloſe the greateſt Area, under any given Number of ſtrait Lines, the Figure or Polygon muſt be inſcribed in a *Circle*, the biggeſt thoſe *Lines* can admit of, and therefore when the *greateſt Area* is contained under them, and *another Line required*, the whole *Figure* muſt alſo be inſcribed in a *Circle*, *the biggeſt poſſible*; which will be when the required Line is the Diameter, and the other Lines Chords, in that Semicircle; becauſe the *whole Circle* will then be the greateſt, and the *required Line* the longeſt, poſſible, when all the Lines (*given* and *required*) are ſo inſcribed in the Half-Circle: Therefore, to find the greateſt Area ſo contained, we muſt *firſt* find the *Diameter*, and then find the *Area*, of the Polygon inſcribed in a Semicircle. To effect which, the *Palladium-Author* has given us a *general and eaſy Method*, for finding the Diameter, (in the *Lady's Diary* for the Year 1738,) by a *Table* of *natural Sines*. In the preſent Caſe, he directs us to find 5 *Chords*, in Proportion of the *Chords* given, AB, BC, CD, DE, EF. By a few *Trials*, I find the $\angle AQm$ under Half the Chord $= 5^\circ\ 50'$, the next leſs to a Minute, and $5^\circ\ 51'$ the next greater. See the *Operation* below.

	°	′	″	‴	Nat. Sines.	°	′	″	‴	Nat. Sines.
The ∠s taken correſponding to the natural Sines are	5	50	0	0 =	.1016351	5	51	0	0 =	.1019245
	11	43	41	42 = 2X	.1016351	11	45	43	40 = 2X	.1019245
	17	45	8	52 = 3X	.1016351	17	48	16	55 = 3X	.1019245
	23	59	15	41 = 4X	.1016351	24	3	37	6 = 4X	.1019245
	30	32	32	33 = 5X	.1016351	30	38	19	16 = 5X	.1019245
	89	50	38	48		90	6	56	57	
Comp.	9	21	12	Difference,		89	50	38	48	
						16	18	9	Difference.	

Now

Now ſay, as 16′ 18″ 9‴ : 66″ :: 9′ 21″ 12‴ : 34″ 25‴, to be added to the next leſs Angle; whence 5° 50′ 34″ 25‴ is the true Angle AQ*m*. Conſequently, 11° 41′ 8″ 50‴ = the Angle AQB; and, ſince AQB is an *Iſoſceles Triangle*, the Angle QAB = ABQ = 84° 9′ 25″ 35‴. Then, by *Trigonometry*, as 11° 41′ 8″ 50‴ (.2025443) : 1000 :: 84° 9′ 25″ 35‴ (.9948047) : 4912.77562 = the *Semidiameter* AQ; whence AF = 9825.55124 Yards, the *Diameter required*. And the *Area* of the Polygon is eaſily found = 33818081.405 ſquare Yards; which being divided by 4840, the ſquare Yards in 1 Acre, quotes 6987.2069 Acres, the greateſt Area that can be incloſed as required.

PRIZE-QUESTION *anſwered by Mr.* Richard Dalton, *of* Pool, Carmarthen.

ACCORDING to Mr. *Heath*'s Invention, in the *Lady's Diary* for the Year 1738, being much the eaſieſt Method of Solution, I find 5 Chords in the Proportion of the Chords given, AB, BC, CD, DE, and EF. AF the 6th *Fence*, or *Diameter* of the Semicircle *required*. By a few Trials, the ∠AQ*m* is between 5° 50′ and 5° 51′; then,

N.S.	°	′	″	‴
.1016351 = Nat. Sine of	5	50		
× 2 =	11	43	41	43
× 3 =	17	45	8	52
× 4 =	23	59	15	41
× 5 =	30	32	32	33
	89	50	38	49
Comp.	9	21	11	= *a*

N.S.	°	′	″	‴
.1019245 =	5	51		
× 2 =	11	45	13	40
× 3 =	17	48	16	55
× 4 =	24	3	37	6
× 5 =	30	38	19	16
	90	6	56	57
Subtr.	89	50	38	49
Diff.	16	18	8	= *b*.

b : 60″ :: *a* : 34″ 25‴ } Sum = 5° 50′ 34″ 25‴ = true ∠AQ*m* = *d*.
+5 50 0 0 }

Per Trigonometry, *d* : ½AB :: *Radius* : 4911.54 Yards = AQ. Whence AF = 9823.08 = the *Diameter required*. Conſequently, the greateſt Area of the *Polygon* ABCDEFA, by the known Method, is 6985 $\frac{559}{4840}$ Acres, very nearly; being a *general practical Rule*, when one Side is required, to form the greateſt Area, with a Number of Sides given.

☞ *The general and practical Rule, to incloſe the greateſt Area, by any Number of ſtrait Sides given, or with any Number of Sides given, and another required, is, to inſcribe the Figure with all the Sides given, or with theſe and one more required, in a Circle: When the required Side will always be the Circle's Diameter.*

PALLADIUM-AUTHOR.

It ſeems, by Mr. *Lamb*'s and Mr. *Dalton*'s Figures being both *exactly alike lettered*, in Succeſſion, A*m*BCDEFQ, (even to the *Sameneſs* of *m* and Q,) that they have ſeen each other's Solutions; but, Mr. *Lamb*'s being the *more general, explained*, and *exact* in the Concluſion, he juſtly in Preference claims the *Prize*; though Mr. *Dalton*'s Solution has its great Share of Merit.

Theſe two are all the Anſwers to the Prize-Queſtion we received.

†‡† An *ingenious Correſpondent*, at *Biſhop-Wearmouth*, ſent us ſeveral Solutions, in his Letter of *September*, 1773, coming too late to be noticed before.

*** The *Anſwers* to *W. Wimple*'s *Queſtions* are yet forced to be excluded for Want of Room.

NEW

NEW ÆNIGMAS.

I. ÆNIGMA 250, *by Mr.* Iſaac Gumley.

WITH no ambitious Thirſt for Praiſe
In Solitude I paſs my Days,
Secure from Soul-perplexing Strife
And all the turbid Scenes of Life.
Like ſome old *Hermit* in his Grot,
By almoſt all the World forgot,
'Tis ſeldom I preſent my Face
To any of the human Race;
Yet I've, by Chance, ſometimes been ſeen
By *John* and *Suſan* on the Green,
As Hand in Hand they gently mov'd,
And told each other how they lov'd!
O *Suſan*, why then didſt thou fear?
Nor Foe to *John* or you was there,
But once come out to ſip the Dew,
As ſoft, though not ſo fair, as you.
I ne'er concern myſelf with States,
Or read or hear their long Debates;
For *Wilkes* or *N--th* I ne'er contend,
Or own myſelf as either's Friend:
In Controverſies I ne'er enter
Between the Churchman and Diſſenter;
Without Deſire of Place or Penſion,
The Faults of Parties I ne'er mention:
Yet ſome there are ſo much my Foes,
That all my Actions they'll oppoſe,
To trap me lay their deadly Snares,
And take my Life — aye unawares.
Why will you let your Anger riſe?
Can Nothing but my Death ſuffice?
Ah! why ſo cruelly inclin'd,
To fight againſt the *deaf* and *blind*?
For moſt did once, and ſome there are
That ſtill, with Confidence declare
I never heard melodious Strains,
Or ſaw the Flow'rs adorn the Plains,
Though round me Flow'rs unnumber'd ſpring,
And Birds of many Species ſing.
But ſtay, leſt I ſhould tire your Patience
With theſe nonſenſical Narrations,
The Theme no longer I'll purſue,
But gladly bid you all adieu.

II. ÆNIGMA 251, *by Mr.* William Swift, *of* Stow, *near* Lincoln.

I came of *Cyclopean* Race,
Like them one Eye, t'adorn my Face,
I'th' Middle of my Front has Place.
You'll judge me, by my Equipage,
The greateſt Warrior of the Age;
For, if you do ſurvey me round,
Nothing but Steel is to be found,

As I go armed *Cap-a-pee*
Like the old Knights of Errantry,
But am not fam'd for Chivalry.
Giants or Monſters I ne'er kill,
But tender Ladies Blood I ſpill;
So what I am, ye Fair, explore:
I think I need to ſay no more.

III. ÆNIGMA 252, *by Mr.* Stuckfield. *of* Stepney.

WE'RE a ſtrange Sort of Figure,
Some ſmaller, ſome bigger,
And many ſad Bruiſes ſuſtain;
When you make an Excurſion
We give you Diverſion,
Beat down oft, we're ſoon up again.
To the Foe we give Battle,
Who make our Sides rattle,
And ſometimes we're all of us ſlain.

IV. ÆNIGMA 253, *by Mr.* W. Marſden.

THE Subſtance, that does me compoſe,
By Vegetation firſt aroſe.
For various Uſes I'm deſign'd,
And various Ways I ſerve Mankind.
My Worth was known in Days of old,
As we in holy Writ are told;
When *Jacob*'s Sons to *Egypt* went,
With them I likewiſe too was ſent.
The *Farmer* knows me very well,
Within his Houſe I often dwell;
Sometimes he hugs me by his Side,
On Horſeback, too, I with him ride.
A Woman's Garment bears my Name;
A Liquor alſo bears the ſame.
To all this Nation I'm a Friend,
To all I my Aſſiſtance lend,
Supply their Wants as they require,
And help Men both to Food and Fire.
Enough is ſaid; ſo now proclaim,
And tell to all the World, my Name.

V. ÆNIGMA 254, *by the Rev.* Thomas Vaughan.

OF all th' *Ænigmatiſts* that e'er did write,
Not one of them but has forgot me quite;
Though I'm as fit a Subject, if not more,
Than any other they have touch'd before.
I ſhall not name where firſt I had my Birth,
I'm now tranſported almoſt round the Earth:
In ev'ry noted Place I make a *Show*,
And much admir'd I am where'er I go;
On each Birth-Day I conſtantly am ſeen,
And always preſent with the King and Queen:
At Routs and Balls I always do appear;
It would ſurpriſe if I were wanting there.
In me all Sorts of People do deſcry
Ten-thouſand Charms to captivate the Eye;

But

But moſt of all, ye Ladies, who are coy
And peeviſh if ye cannot me enjoy,
Who never think yourſelves completely dreſs'd
If with my Company you are not bleſs'd;
Adorn'd with me, when you conſult your Glaſs,
You're charm'd, and ſay, that all Things I ſurpaſs!
The fineſt Ladies that are in this Land
Will give me Liberty to kiſs their Hand:
There's not a Peer, of whatſoe'er Degree,
But would be pleas'd to be poſſeſs'd of me,
(None can deny it,) as I have been told,
For Hundreds, nay for Thouſand Pounds, in Gold:
Though ſo much valu'd, yet it muſt be ſaid
That I'm a very red'ning, flaſhing, Blade.
Ladies, this ſingle Hint I'd have you take —
I cut myſelf in Pieces for your Sake.

VI. ÆNIGMA 255, *by Mr.* W. Swift.

ALL Shapes and Features I can boaſt,
Though neither Fleſh, Blood, Bone, or Ghoſt;
Nor Male, nor Female; nor my Sex
Could Natur'liſt yet ever fix.
I ne'er was born, nor e'er can die,
Tell me, ye wiſe ones, what am I?

VII. ÆNIGMA 256, *by Mr.* W. Penn.

I was born in the Year of our Lord *Forty-Eight*,
And have pleas'd young and old, both the ſmall and the great,
There's none of the Kind, you will find, except me,
None ever before me, nor after, can be.
In Truth I'm array'd, to improve you pretend;
Though Envy I've rais'd, yet I ne'er want a Friend:
Each Year I go forth, with freſh Honours abound,
And I viſit my Friends all the Country around.

VIII. ÆNIGMA 257, *by the Rev.* Thomas Vaughan, M. A.

WE are ſeven Brethren of great Worth and Fame,
We've Names all ſeparate, yet we've all the ſame:
Our *Captain*'s celebrated, through the Nation,
By Multitudes of every Rank and Station.
Though he has Nothing of his own to give,
Yet he makes many Hundreds richly live.
By us the Nobles of the Land are fed,
By us the Gentry get their daily Bread;
Nay every one who has great Sway and Power,
Without our Help could not ſurvive an Hour.
We Pleaſure give to many in this Iſle,
When we upon them do vouchſafe to ſmile.
The Farmers, Merchants, Tradeſmen, all depend
On us; we are their beſt and ſureſt Friend.
If we were abſent, all Men do agree,
This World would Nothing but a Shadow be.
If ſtill we're not found out, ye beauteous fair,
Conſult your Pray'r-Book and you'll find us there.

IX. ÆNIGMA 258, *by* Dunelmenſis.

I am a roaring *Whirligig*, rooa, rooa, rooa,
And wear a ſtately Periwig, roo, roo, roo;
I never eat a Bit of Meat, rooa, rooa, rooa,
But only when I ſnore and ſleep, roo, roo, roo.
Out of my Wig comes all my Food, rooa, rooa, rooa,
Which I devour and roar aloud, roo, roo, roo.
But ſtrange it is, yet 'tis no Lie, rooa, rooa, rooa,
My Food I take in at my Eye, roo, roo, roo;
And thence convey it to my Teeth, rooa, rooa, rooa,
Who ſend it to my Paunch beneath, roo, roo, roo.
Without me many a *Beau* would ſtarve, rooa, rooa, rooa,
And many a Girl whom now I ſerve, roo, roo, roo.

X. ÆNIGMA 259, *by Mr.* William Swift, *of* Stow, *near* Lincoln.

I'M a Word of *ſix Letters* when ta'en the right Way,
By the Side of a *Brook* I am found, as ſome ſay,
At Evening and Morning and Noon Time of Day.
My Beginning and Ending, when cut through the Middle,
Exactly's the ſame, ſhould you find out the Riddle.
Reverſe but the Subject, you'll ſoon find me out,
By a Liquor of Liquors, you need not to doubt.
In your Thoughts you *divide* me your Point to obtain,
Which will tell my Name, Ladies, again and again.

XI. ÆNIGMA 260, *by Mr.* Iſaac Gumley.

STAND off awhile, ye ridling Race,
And give your truſty Friend a Place:
Attend, while I attempt to ſpeak,
In Strains uncouth and Language weak.
To Prince and People I'm a Friend,
And to the Pope Aſſiſtance lend;
Though he, with all his Pomp and Glory,
Can't reſcue me from Purgatory.
The Shepherd with his homely Crook,
That tends his Flock beſide the Brook,
With Chearfulneſs in ev'ry Look,
Muſt own that I'm his conſtant Friend
And Day and Night his Sheep attend.
The Poets, whoſe exalted Verſe
The World enraptur'd does rehearſe,
Apollo's peerleſs Progeny,
Are all aſſiſted much by me. —
The Prieſt, with Band and Caſſock grac'd,
Is to the lofty Pulpit rais'd;
So 'm I; and there, the Truth to tell,
In Duty I the Prieſt excel,
Though I'm to Goodneſs ne'er inclin'd,
Nor did I e'er Religion mind. —
Ænigmatiſts, now deign to ſmile,
And ſpread my Name through *Albion*'s Iſle.

XII. ÆNIGMA 261, *by Mr.* Swift.

ONE Moment I both live and die;
And yet, ſo very old am I,
That none my Age e'er yet came nigh.

Unequal

Unequal Steps to me belong,
One Moment ſhort, another long.
One Minute will my Name unmaſk;
You have my Leave the ſame to aſk.

XIII. ÆNIGMA 262, *by Mr.* G. Lacey.

NO Hearts together, in the *Loom* of Love,
Than we were ever yet more cloſely wove;
Or knit together in ſweet Union's Bands,
When *Hymen* joins two Lovers willing Hands.
We're ſeen in Pairs — have each a Mouth to eat —
Are ſometimes fed with Corns, (not Corns of Wheat,)
And frequently we Fleſh and Bones devour,
But ne'er digeſt them — 'cauſe we want the Pow'r.
We numerous are — are almoſt each one's Stock —
By ſome of us you may ſee what's the Clock.
We've Ribs in great Abundance — but for Skin,
Have none without, but often have within.
Sometimes by Accident our Ribs are broken;
If *oft* it happens, it does our End betoken:
For few, repeatedly, will thus befriend 'em;
So *often* broke, few *often* care to mend 'em.
Thus we our End, to Tatters broken, meet,
And now are, as before, trod under Feet.

XIV. ÆNIGMA 263, *by Mr.* I. Gumley.

1. WITH wooden Caſe, and brazen Face,
And no ſmall Share of Beauty,
I ſtand upright, both Day and Night,
Performing of my Duty.
2. In ev'ry Town of much Renown
I climb the lofty Steeple;
And ev'ry Day from thence convey
Mementos to the People.
3. I'll ſay no more, for you'll explore
Full ſoon my Appellation;
For I am known in ev'ry Zone
And almoſt ev'ry Nation.

Clock

XV. ÆNIGMA 264, *by Mr.* J. Hunt.

EIGHT Letters do compoſe my Name,
And *all the Vowels* grace the ſame.

XVI. ÆNIGMA 265, *by Mr.* J. Hunt.

THREE Letters together compoſe my whole Name,
Which backward or forward will ſtill read the ſame;
To make myſelf clear, when bright Beauties alarm,
The Moment I ſtrike you, like *Magic* I charm.

XVII. ÆNIGMA 266, *by Mr.* J. Scott, *of* Cawthorne.

I was form'd by Man of Metal,
But am neither *Can* or *Kettle*;
Cylindrical my Form is found;
With many Eyes I do abound.

My Appetite's ſurpriſing good,
Digeſting ſoon my ſolid Food.
As to my Trade and Occupation,
I'm very uſeful through the Nation;
Nocturnal Viſits oft I've made;
You to and fro I moſtly aid.
My Brother Nameſake, you muſt know,
Does ſometimes make a *Phantom* Show;
Though he is Nought to me a-kin;
My *Quaker Light* is all within.

*** *Whoever ſends the beſt Anſwer, in Verſe, to the following Ænigma, before* Candlemas-day *next, has a Chance, by Lot, to win* 5, 4, *and* 3, Palladiums.

PRIZE-ÆNIGMA, *by Mr.* Iſaac Gumley, *of* Counteſthorpe.

ATTEND for a While, O ye buxome young Swains,
That ſaunter, and whiſtle it over the Plains,
Your muſical Notes for a Moment ſuſpend,
And liſt to the Tale of your intimate Friend.
Should I talk of my Beauty, you'd think me quite vain,
Or count that Ambition had quite turn'd my Brain;
Yet this I will ſay, without Shame, to your Faces,
That I am attended by many ſweet Graces;
My Merits are ſuch, that you always regard me,
And ne'er, till I'm wholly grown uſeleſs, diſcard me.

The Doctor, ſo grave, that delights in a Fee,
Has ſpent many Hours in Retirement with me;
The Parſon, adorn'd with a Caſſock and Gown,
That with ſanctified Face gives Advice to the Town,
The Heroes, rejoicing in Bloodſhed and War,
And Nobles, adorn'd with a Garter and Star,
The Lawyer, Mechanic, and Farmer to boot,
Muſt own that I all their Conveniences ſuit.

Miſs *Molly* and *Jenny*, for Beauty ſo fam'd,
To love and careſs me are never aſham'd;
With them I each Night to their Chambers retire,
And ſtay till bright *Phœbus* rekindles his Fire.

My Form is ſo odd, that, without telling Lies,
I may ſay that I never had Head, Noſe, or Eyes;
Yet a Mouth I oft have, O ye Swains, let me tell ye,
Which opens a Paſſage quite down to my Belly;
A Mouth that contributes to give you Delight,
And chear the dull Minutes that wait on the Night.

My Colour oft varies, for ſometimes I'm ſeen
As fair as young *Nancy*, the Pride of the Green,
Yet, ſtay but a While, and you'll find me allure
With Viſage as grim as an *African* Moor.

Sometimes I am ſeen by a rattle-ſkull'd Rake,
And then I but little Enjoyment partake;
Yet diff'rent I fare at my good Mother *Hyde*'s,
And Plenty of Fat doth embelliſh my Sides.

My Maker deſign'd me and made me quite couth,
Then married me unto a roſy-comb'd Youth;
Young *Dolly* (firſt taking him up in her Hands)
Cemented at once the ſoft conjugal Bands:

And

And now he ſo much my Affection doth win,
I open my Mouth and invite the Youth in,
And ſometimes he moves up and down in my Middle,
As quick as a Bow on the Strings of a Fiddle.
But ſhort, very ſhort, is my Paramour's Stay,
In am'rous Enjoyment he melteth away,
No more am I bleſs'd with a Sight of his Face,
But one of his Brothers ſupplieth his Place.
Now ſay what I am, O ye amorous Swains,
Then take me, and call me your own for your Pains.

†‡† *Several of our ingenious Correſpondents are deſired to excuſe us for not inſerting their obliging Performances we have not Room for; as we are obliged to fill up with Things the moſt ſuitable to our Plan, it is impoſſible to oblige every Correſpondent by inſerting their Productions, which would require a large Volume in Folio to accompliſh.*

NEW QUERIES.

I. QUERY 241, *by Mr.* Iſaac Gumley, *of* Counteſthorpe, Leiceſterſhire.

ASSIGN me ſome *Reaſons*, ye Swains that are taught 'em,
Why Winds are ſo boiſt'rous at *Spring* and at *Autumn*.

II. QUERY 242, *by Mr.* W. Hurn, *of* Diſs.

YE *philoſophic Britiſh* Fair,
A Reaſon pray afford,
Why *crook'd-back'd* Men in *England* bear
The Title of *my Lord*.

III. QUERY 243, *by Miſs* Polly Stow *to Mr.* Gumley.

The *Attendants* on Love, my good Friend, make appear,
In your much-lov'd *Palladium*, deſign'd for next Year.

IV. QUERY 244, *by Miſs* Stow.

HOW are the *Parts* of Life divided, ſay;
I'll do as much for you another Day.

V. QUERY 245, *by* Inveſtigator.

WHETHER from the *North-Weſt Paſſagers*, the *Otabeitean Circumnavigators*, or the *Longitude Diſcoverers*, the greateſt Advantage has ariſen to the *Britiſh* Nation.

☞ The *Anſwer* to the *Query*, inferring the Time of the Earth's Creation to be about *September*, becauſe of the Fruit-Seaſon, and Herbs yielding Seed or Kernel, is no Inference; there being a *ſimilar Seaſon* in the ſame Latitudes of the Earth round the Globe; and a *contrary Seaſon* at the ſame Time in Places of contrary Latitudes. This looks like the Rev. Mr. *Kennedy*'s Inference (handed about by ſome other of our Correſpondents) in his *erroneous* and *ſuperſtitious Chronology*, where he aſſigns the Time of the Earth's Creation to a *Minute*.

NEW REBUSES.

I. REBUS, *by Mr.* Stuckfield, *of* Stepney.

TO *Half* a Tranſlator of Shoes,
In *Eſſex* a Town muſt be join'd;
The Name of a *Lady* enſues,
Accompliſh'd in Perſon and Mind.

II.

II. REBUS, *by the Rev.* Thomas Vaughan, M. A. *of* Morpeth.

WHAT all Maids of fifty do wiſh it could be,
And what they *love better* than Coffee and Tea,
Join'd together, will find you a Beauty of Parts,
Who, by her Behaviour, has vanquiſhed all Hearts.

III. REBUS, *by Mr.* W. H. *of* Newcaſtle.

WHAT, long poſſeſſing, may all ſhare!
An *Inſect*, prais'd for its great Care;
A *Beaſt*, the fierceſt of the Plain;
What rules, when Council we diſdain;
Th' *Initials* join'd a Fair will tell,
Where Beauty, Wit, and Virtue, dwell.

IV. REBUS, *by Mr.* John Bailley, *of* Middleton, Yorkſhire.

TO a *Place* where the weary repoſe
Three fourths of an *Element* join,
And a Borough in *Wilts* 'twill diſcloſe
Where lives a dear choice Friend of mine!

V. REBUS, *by Mr.* John Bailley.

IF you can gueſs *how far* I walk'd
To pleaſe my Friend's Deſire,
Tranſpoſe the ſame, and then 'twill name
A Town in *Dorſetſhire*.

VI. REBUS, *by Mr.* John Bailley.

THREE-FIFTHS of a *Prophet*, once ſav'd by a Whale,
A known Correſpondent and Friend will reveal.

VII. REBUS, *by Mr.* Bailley.

THE Reverſe of what's *old*, and the Sound of a *Horn*,
Will name you a Fair-One as blithe as the Morn.

VIII. REBUS, *by Mr.* William Marſden.

FIRST Half of a *Hall*, the laſt two-thirds of *Father*,
Then an *Herb* us'd for Tea, make a *Town*'s Name together.

*** We acknowledge a *Rebus* received this Year from *Cleonicus*, of *Kendal*, (on *Madam*, reading forward and backward the ſame,) but the *Subject* was propoſed lately before.

NEW PARADOXES.

I. PARADOX, *by Miſs* Polly Stow.

MY *Partner* and *I* together ſet out
Upon a long Journey, and went it throughout;
I travell'd the *faſter*, and left him behind;
The *farther* I left him the *nearer* we join'd;
But when I the *fartheſt* before him could get,
We both were *together*; — ah! Partner, well met!

II. PARADOX, *by Miſs* Stow.

I'VE ſeen you where you *never* were,
And where you *ne'er* will be,

And

And yet within that very Place
You ſhall be ſeen by me.

III. PARADOX, *by Mr.* W. Penn, *of* Chalfont.

A *Weight* on th'Earth's Surface weighs three Hundred Pounds one;
Where will this Weight weigh three Hundred one Ton?

IV. PARADOX. *by Mr.* William Swift, *of* Stow.

I travell'd *twenty* Miles a Day,
And each Day in the Year;
Each Night I rode an *equal* Way
As I can make appear.
A Friend of mine in *Britain*'s Iſle
Will hold you Guineas ten,
I went no more than *forty* Miles:
What ſay you, Gentlemen?

V. PARADOX, *by* Gemini, *of* Morpeth.

A *Board* ſixteen Feet long and nine broad I've to ſpare;
By cutting it through, I can fill twelve Feet *ſquare*.

VI. PARADOX, *by a Perſon of five Feet nine Inches, who rides a Horſe fifteen Hands high.*

HOW far muſt I *walk* to the *South*, reconcile,
For my Head to go *more* than my Feet by a Mile?
How far *ride* my Horſe? and *which Way?* — Can you gueſs?
For *one Side* than *t'other* to go two Miles *leſs*.

NEW QUESTIONS.

I. QUESTION 526, *by Mr.* Iſaac Gumley, *of* Counteſthorpe, Leiceſterſhire.

FROM theſe *four Equations*,* ye Artiſts, explore,
What wiſe Men think uſeful, and Boobies adore;
For *this*† the ſmooth *Orator* lets out his Tongue,
And ſtrives to convince us that Right is quite wrong;
For *this* the fair Ladies, ſo well form'd to pleaſe,
Reſign all their Charms to old Age and Diſeaſe.

*Given $\begin{cases} v+x+y+z = v^2-y-z \\ v^2+x^2+y^2+z^2 = v^3+v^2-10 \\ vxyz+1012 = zy^3 \\ x = 2v \end{cases}$ Where v, x, y, z, denote the *Letters Places* in the Alphabet, compoſing the *Word*† required.

II. QUESTION 527, *by Miſs* Polly Stow.

PALLADIUM Artiſts, pleaſe to try
To find out x, and alſo y,
From theſe Equations here below;
You'll much oblige me, *Polly Stow*.

$$x^3+y^3+x^2-xy = 76864.$$

$$4x^2-44y^2+\overline{x+y}^4 = 615104.$$

III. QUESTION 528, *by the* Palladium-Author *junior*.

THE *Enterprize* Frigate, running before the Wind at the Rate of 10 Knots (or Miles) an Hour, gave Chace to a *Spaniſh Guarda Coſta*, then 4 Leagues (or

12 Miles) a-head, making Way from the *Enterprize*, directly forward, at the Rate of 7 Miles an Hour: In what Time will the *Enterprize* come up with the *Spaniſh Guarda Coſta*?

IV. QUESTION 529, *by Mr.* William Penn, *of* Chalfont, Bucks.

MY Grandfather was born in the Year the laſt Time but one (from the Year 1774) when *Eaſter* fell on the 25th of *April*; and I was born in the Year the laſt Time *Eaſter* fell on the ſame Day. *Required* the Age of my Grandfather when I was born: and how much will my Age exceed the Age of old *Par*, if I live till *Eaſter* falls on the ſame Day again, O. S.?

V. QUESTION 530, *by Mr.* Shadgett, *of* Roſs, Herefordſhire.

A Gentleman has *two Gardens*, one in the Form of a *Circle*, and the other of a *Square*, each containing 2231$\frac{3}{4}$ *ſquare Yards*: But he intends to leſſen the one and enlarge the other, by making the *Side* of the Square equal to the *Diameter* of the Circle, ſo as they ſhall contain together the ſame *Area* as at preſent: What will then the *Area* of each Garden be?

VI. QUESTION 531, *by Mr.* W. Penn.

HOW high from the Earth muſt I be,
Juſt *two-fifths* of its *Surface* to ſee?
What would a *Pound here* weigh *there*?
And *how long* deſcending to our *Sphere*?

VII. QUESTION 532, *by Mr.* J. Gibſon, *Drummer in the 68th Regiment.*

YE *Britiſh* Youth, who, each ſucceſſive Year,
Strive to excel, and make your Worth appear,
Diſcloſe my Name* — nor fear to gain Applauſe
By being true to King and Country's Cauſe.

*Given $\begin{cases} w+x+y-z = 19 \\ wx + yz^2 = 2948 \\ w^2+y^2-x^2 = 127 \\ wxy - z^2 = 1216 \end{cases}$ The *Values* of w, x, y, and z, are the Letters Places in the Alphabet compoſing my *Name*. *Newcaſtle, May* 24, 1774.

VIII. QUESTION 533, *by Mr.* John Clark, *Schoolmaſter, at* Great Ryle, Northumberland.

THE Length of the Axletree of a Carriage is 4 Feet 10 Inches; the Diameter and Diſk of the Wheel are 4 Feet 1 Inch, and 5 Inches, reſpectively: To find how high the one Wheel may be raiſed off the *Plane* whereon the Carriage ſtands, ſo as the under Spokes of the other Wheel may be perpendicular to the ſaid Plane.

IX. QUESTION 534, *by Mr.* John Shadgett, *of* Roſs, Herefordſhire.

TWO Graziers, A and B, returning from *Smithfield* Market, were met by a Highwayman, who took a certain Number of *Guineas* from each of them, expounded by the following *Equations*,* where x denotes the Number taken from A, and z the Number taken from B: What Sterling Money did each Perſon loſe?

*$\frac{\sqrt{x^3z} - \sqrt{z^3x}}{\sqrt{xz}} = z.$ $x^{\frac{4}{3}} = z^{\frac{3}{2}}.$ To find the Values of x and z.

X. QUESTION 535, *by Mr.* Robinſon, *of* Biddick.

REQUIRED the Diameter of the *greateſt Semicircle* that can be inſcribed in a right-angled Triangle, whoſe Baſe and Perpendicular are 20 and 15 Inches.

XI.

XI. QUESTION 536, *by Mr.* Edward Johnſon, *Surveyor, of* Hull.

GIVEN the vertical Angle of a plain Triangle = 70°, the Sum of the three Sides = 176, and their continual Product = 142000, to find the Sides ſeparately.

XII. QUESTION 537, *by the* Palladium-Author *junior.*

SOME Perſons agreed with a *Coach-Maſter* to pay him a *Guinea*, for Coach-Hire, for their Journey; who afterwards, on the Road, agreed with the *Coachman* that, for every Perſon he took in by the Way, *three Shillings* ſhould be abated to them from the *whole Fare* firſt agreed on: In Conſequence whereof, the *Coachman* received, at his Journey's End, *four Shillings* from each of the whole Number of Paſſengers, *(including the firſt and thoſe taken in,)* whereby he gained *three Shillings* to himſelf above the *Guinea* he was to pay to his *Maſter*. *Required* the Number of Paſſengers firſt ſetting out, and thoſe taken in by the Way.

XIII. QUESTION 538, *by* Amicus, *of* Northumberland.

A Ship, in Latitude 52°, is bound to a Port in Latitude 55°, lying due N. and S. of each other; between which a *Current* extends from Latitude 53° to Latitude 53°½, which will carry the Ship upon a S. W. Courſe, at the Rate of 5 Miles an Hour: Now, ſuppoſing the Ship to ſail at the Rate of 6 Miles an Hour before ſhe arrives at the *Current*, and at the Rate of 7 Miles an Hour after ſhe is out of it, *what Courſe* muſt ſhe ſteer to perform the Voyage in the *leaſt Time poſſible?*

XIV. QUESTION 239, *by Mr.* Richard Dalton, *of* Pool, Carmarthen.

A *Boat* is to be built, whoſe Length at the Keel is 20, Depth at the Midſhips 4, and Draught of Water at the Stern 2½ Feet: *Required* the proper *Breadth*, and the *Conſtruction* of that Part which is to be in the Water, by an *eaſy Rule*, to make the Boat ſail the *faſteſt poſſible*.

XV. QUESTION 540, *by Mr.* Shadgett.

A heavy *Iron Ball*, falling in a perpendicular *Direction* from the Top of a *Tower*, was ſeen by a Perſon ſtanding at a Diſtance on a *Level* with the Tower's Baſe; who obſerved that the Time of the Ball's *Deſcent*, while it was ſeen falling to the Ground, was *equal* to the Time in which he heard the Sound of the *Ball* after its ſtriking the Ground; and the *neareſt* Diſtance from the Place where he ſtood to the Top of the Tower, whence the Ball fell, was 2500 Feet: *Required*, from thence, the Tower's Height, and the *Diſtance* from the Baſe thereof to the Place of *Obſervation*, where the Sound of the Ball, falling to the Ground, was heard.

XVI. QUESTION 541, *by Mr.* Robinſon, *of* Biddick.

REQUIRED the *Dimenſions* of an *Ellipſis*, that will circumſcribe an *Oblong*, whoſe Length is 200 and Breadth 120 Yards, with the Area of each Segment.

XVII. QUESTION 542, *by* Amicus, *of* Northumberland.

SUPPOSE two Ships, from a certain Port in N. Latitude, bound to two different Ports under the *Equinoctial*, the one 50 and the other 110 Miles *Weſt* of the Meridian ſailed from: *Required* the Latitude of the Port, when the Angle, included by their Courſes, is a *Maximum*; ſuppoſing each Ship to ſail on a great Circle of the Sphere.

XVIII. QUESTION 543, *by Mr.* Arſon Caſtings, *of* Leiceſter.

GIVEN $\left\{\begin{array}{l} x^3y^2 + x^2y^3 = 700 \\ x^2+y^2 \times \overline{x+y} = 203 \end{array}\right\}$ To find the Value of x and y.

XIX. QUESTION 544, *by Mr.* John Matthewſon, *of* Fatfield, Durham.

IN a right-angled Triangle, the *Difference*, between its *Area* and the *Areas* of its inſcribed Circle and inſcribed Square, = 71.46 and 76.532 reſpectively. To determine, from thence, the Triangle.

XX. QUESTION 545, *by Meſſrs* J. B Lee *and* W. Sedgwick, *of* Cottingham-School.

THE *Diagonal* of a *conic Fruſtum* = 100 Inches, and the Difference of its Top and Bottom Diameters = 20 Inches: *Required* its Dimenſions when the *Content* is a *Maximum*.

XXI. QUESTION 546, *by Mr.* William Hayes, *of* Frodſham, Cheſhire.

THE two oppoſite Sides of a *Trapezium*, inſcribed in a *Semicircle*, (the longeſt Side of the *Trapezium* being the Diameter,) are given, alſo the Angles at the Interſection of the *Diagonals*, to conſtruct the *Trapezium*.

XXII. QUESTION 547, *by* Gemini *of* Morpeth.

THE Miles 'twixt *Newcaſtle*, and *Morpeth*, and *Hexham*,
Have thus been propos'd to ſome Friends to perplex 'em.
" From *Newcaſtle* to *Morpeth* is ſo much and no farther;
" From thence unto *Hexham* ſix Miles more than t'other.
" To *Newcaſtle* juſt five more than thoſe laſt will ſhew;
" From each Town to a Houſe in the Midſt you may view."* *12.516
The ſeveral Diſtances thence make appear, *Miles.*
And Thanks will be due for your Service next Year.

XXIII. QUESTION 548, *by Mr.* Michael Taylor, *of* Marley-hill.

IN North Latitude, on a certain Day of the Year 1772, the *Shadow* of my Walking-Stick, ($5\frac{1}{2}$ Feet long,) ſtanding perpendicular to the *Horizon*, at 7 in the Morning was 8 Feet and 3-7ths; and, 4 Hours after, its *Shadow*, in the ſame Place, was but $6\frac{1}{3}$ Feet: *Required* the *Latitude* where, and *Day* of the Year when, this happened, by a *quadratic* Equation.

XXIV. QUESTION 549, *by Mr.* Joſeph James, *of* Stoke-Biſhop, *near* Briſtol.

A Brewer intends erecting a *round Ciſtern*, that ſhall hold 1577.57616383 Gallons. He would have the Diameters at the Top and Bottom in the Proportion of 4 to 3; alſo the Depth and leſs Diameter are to be in the *given Ratio* of 7 to 9: *Required*, from thence, the *Dimenſions* of the Ciſtern.

XXV. QUESTION 550, *by Mr.* Joſeph James.

IF you deſire to know a Poet's Name,
From *hence** you may diſcover one of Fame.

$$\left.\begin{aligned} *wvx + y - z &= 250 \\ wx^2 - w^2x &= 510 \\ wxy &= 2295 \\ x - w &= \frac{z}{7} \end{aligned}\right\}$$

Where w denotes the 1ſt Letter, x the 2d and 5th Letters, y the 3d and z the 4th Letter, compoſing his Name.

XXVI. QUESTION 551, *by Mr.* William Hardy, *Maſter of* Cottingham-School, *near* Hull.

REQUIRED the three Angles of any *right-angled Triangle*, whoſe Sides are expreſſed by x^{3x}, x^{4x}, x^{5x}, reſpectively.

XXVII.

XXVII. QUESTION 552, *by Mr.* W. Hardy.

REQUIRED the three Sides of any *right-lined Triangle*, the Sum of which Sides $= x^x$, (where x is the longeſt Side,) and the three *given* Angles, 70, 60, and 50 Degrees, reſpectively.

XXVIII. QUESTION 553, *by Mr.* Iſaac Gumley, *of* Counteſthorpe.

GIVEN $\left\{\begin{matrix} x^2y + xy^3 = 300 \\ x^6y^2 + x^2y^6 = 48528 \end{matrix}\right\}$ Required the Values of x and y.

*** *Whoever ſends the beſt Anſwer to the following Queſtion, before the Beginning of* April, *has a Chance to win* 12 Palladiums. *Dentur Digniſſimo.*

PRIZE-QUESTION, *by Mr.* Rowland Wetherald, *of* Biſhop-Wearmouth.

REQUIRED the *Time* and *Magnitude* of a *ſolar* and *lunar Eclipſe*, by a *general Rule*, excluſive of *aſtronomical Tables* or the *Plinian* or any other Period.

N. B. *Of the* Queſtions *ſent us, we ſelect the moſt curious and uſeful, without any Regard to Partiality. — Mr.* Alexander Rowe *bids us ſeparate the Wheat from the Chaff: We take the Weeds from the Corn to have the perfecter Harveſt.*

PRIZES WON.

MR. *James Lamb*, of *Aldborough*, 12 *Prize-Queſtion Palladiums*. Mr. *Iſaac Gumley*, of *Counteſthorpe*, 5 *Prize Ænigma Ditto*; *Philo-Sophia*, 4; Mr. *J. Hunt* junior, of *Winſlow-School*, 3; Mr. *William Hurn*, of *Diſs*, 2; Miſs *Jenny Brown*, of *Newcaſtle*, coming in by Lot, 2, there being no *Prize-Quere*; Miſs *Stow*, 3; *Hiſtoricus*, 2. Who are deſired to ſend to Mr. *Cole*'s, in *Fleet-ſtreet*, in their own Hand-writing, for the ſame. — Mr. *Rowe*, unexpectedly, ſent for his 4 *Palladiums* for 1773, after near 2 Years Delay, and had them delivered to his Order: But, if ſuch Delays happen in future, the aſſigned *Palladiums* will be adjudged to ſome more diligent and leſs dilatory Correſpondent.

MEMORIÆ SACRUM.

THE Honourable and Reverend Dr SPENCER COWPER, Dean of *Durham*, Son of the late Lord-Chancellor COWPER, one of the moſt benevolent, worthy, and exemplary in Acts of Goodneſs, of the human Race, (who particularly honoured the *Palladium Author* with his Patronage and Friendſhip,) died, of a lingering nervous Indiſpoſition, (his Strength weakening by Degrees, but his Spirits ſtrong, animated, and clear, to the laſt,) in the City of *Durham*, on the 25th of *March*, 1774, a very great private and public Loſs!

EPITAPH.

In Mind ſagacious, eminent by Birth,
Pattern of Goodneſs and exalted Worth!
Patron of Arts, who Science did extend,
And was to all a charitable Friend:
Modeſt in Merit, wherein moſt he ſhone,
And, never rival'd, he oppos'd not one.
His Life and Acts were truly excellent!
And his own Works are his grand Monument!

PALLADIUM-AUTHOR.

To the PALLADIUM-AUTHOR.

SIR, *Newcaſtle, January* 15, 1774.

Your worthy Correſpondent, and my intimate Acquaintance, Mr. *George Coughron*, is now no more! He died laſt *Sunday* Morning, (*viz. January* 9, 1774.) Since his ſudden Diſſolution (occaſioned by the Small-Pox) I can find no Comfort! W. H.

REMARK. A noble Condolance, made by a worthy Correſpondent, (writing a ſimilar Hand to his deceaſed Friend's) for the Death of another! who was admired and eſteemed by every Lover and Friend to Science, and whoſe valuable *Life* and *Talents* are regretted by none more ſincerely than the

PALLADIUM-AUTHOR.

GEMINI, of *Morpeth*, has ſent us the following Character of, and alſo Epitaph on, Mr. GEORGE COUGHRON, a worthy Youth and excellent Mathematician, much eſteemed for his ſurpaſſing moſt of his Years in Strength of natural Endowments and acquired Abilities.

The CHARACTER *of Mr.* GEORGE COUGHRON, *late of* Newcaſtle-upon-Tyne, *who was untimely cut off by the Small-Pox, in the Flower of his Youth, at* Newcaſtle, *on* Sunday, January 9, 1774, *aged* 23: *His Loſs being greatly regretted by all who had the Satisfaction of knowing him.*

YE Sons of Science, the great Loſs deplore,
The fam'd, th'ingenious, COUGHRON is no more!
The Pride and Wonder of the preſent Age!
Who, though a Youth, improv'd each hoary Sage.
His Strength of Judgement, and his Reaſon clear,
Abſtruſeſt Things could eaſy make appear.
His ſocial Virtues did to all extend;
The kind Companion, and the eaſy Friend.
Heav'n ſaw his tow'ring Genius greatly riſe,
Call'd him to Bliſs, and ſnatch'd him to the Skies!

His EPITAPH.

DEPOSITED within this Tomb doth lie,
All that of this immortal Youth could die!
His great Accompliſhments and tow'ring Fame
To Admiration did lay Claim!
His real Worth none can expreſs,
His Loſs Time never can redreſs!
In Rank he ſtood
Sublimely high;
Too great, too good,
So ſoon to die!
It was no Crime in Fate:
Heav'n gave ſo ſhort a Date!
In him the Virtues all combin'd,
A fit Example for Mankind;
A Precedent to practice by,
To teach us how to live and die!
The Pomp of Nature, Prodigy of Praiſe!
An everlaſting Monument a COUGHRON's Works ſhall raiſe!

GEMINI *of* Morpeth.

Mr.

Mr. THOMAS SADLER's EPITAPH, *who, we hear, died in the Beginning of the Year* 1774.

TOM SADLER's Glaſs and Fire poetic ſpent,
He reſts beneath a COUGHRON's Monument.

PALLADIUM-AUTHOR.

Our Correſpondents have honoured us with their ſeveral Opinions, concerning our Practical Arithmetician or Art of Numbers improved, *as follows.*

To the PALLADIUM-AUTHOR.

SIR, *Stoke-Biſhop, near Briſtol, March* 12, 1774.

From the many Treatiſes, lately publiſhed, on *Arithmetic*, one would be inclined to think the Subject to be almoſt exhauſted: But how great the Deception in the *Practical Arithmetician!* a Performance truly ingenious, and highly deſerving the Notice of all thoſe who have the Care of Youth, or who would aim to acquire a competent Knowledge in Numbers. The *Variety* of *mechanical* and *particular Rules*, which are of themſelves a real Treaſury, are alone worth the Price of the Book. To theſe we may add the great Improvement in *Proportion*, by the *new Method* of *Croſs-Rule*, which *Mathematicians* will find to be of *eſſential Service* in the ſolving high and difficult algebraic Equations. The *Tables* and *Theorems*, for finding the *real Worth* of *Penſions*, *Annuities*, *Reverſions*, *&c.* are more general and extenſive than any I have hitherto ſeen. The *Rules* for the *ſuperficial* and *ſolid Meaſurement* of Variety of Figures, ſo judiciouſly arranged at the End, were much wanting, and greatly increaſes the Worth of this *Treatiſe*. In fine, every candid Reader muſt allow the *Practical Arithmetician* to be far ſuperior to any other Treatiſe of its Kind extant.

I wiſh all your Correſpondents and Readers may be equally impatient with myſelf for the Publication of your *Practical and ſelect Queſtions*: — Every future Production of the *Palladium-Author*, ſenior or junior, will meet with every Support that is in the Power of,

Sir, your moſt obliged Servant,
JOSEPH JAMES.

To the PALLADIUM-AUTHOR. *(At Mr.* Shadgett's *Concluſion of his ſeveral able mathematical Solutions.)*

Roſs, Herefordſhire, May 25, 1774.

AND now, Sir, a Word or two, by Way of *Remark*, on your *Practical Arithmetician*, which juſtly claims the Preference of any Thing I have yet ſeen upon the Subject. Thoſe uſeful *Remarks* and *Obſervations*, interſperſed throughout the *whole Work*, render it an ineſtimable Treaſure; and I am perſuaded that a *Courſe of Mathematics*, executed upon the *ſame Plan*, would *(not to depreciate the Works of Merit)* diffuſe more *mathematical Knowledge* through this Nation than all the Books hitherto publiſhed; the Authors of moſt of which having given no *Illuſtration* at all of the more *ambiguous* and *abſtruſe* Parts of their Works, whilſt they have been *redundant* in their *Explication* in Matters of leſs Moment; and Others ſo very little, and in ſuch a Manner, as rather to *obſcure* than *elucidate* what they have been about to explain. — Hence it is that *Learners*, after having with great Aſſiduity traced out and laboured through the Proceſs of a difficult Problem, ſeldom receive the Satisfaction they expected from the Concluſion; which frequently damps their Inclination, and very much retards their farther Improvement: Whereas a *judicious Remark*, timely introduced, would in all Probability have removed *every Doubt*, enabled them to view Things in their true Light, and at the ſame Time proved a moſt powerful Incitement to future Perſeverance.

J. SHADGETT.

To

To the PALLADIUM-AUTHOR.

SIR, *Portſmouth, January* 22, 1774.

I have, for the ſhort *limited* Space of Time, peruſed your *Work*, and perceive that the common and literal Arithmetic are copiouſly handled. There is not the leaſt Fear of its *Utility* to the Public, as it conſiſts of a *Variety* of curious *Queſtions* and *Obſervations*. I return you many Thanks for the Peruſal of it.

I am, Sir, your humble Servant,

JOHN ROSS.

To the PALLADIUM-AUTHOR. *(In a Poſtſcript to numerous mathematical Solutions.)*

Heſle, near *Hull, May* 2, 1774.

IT gives me Pleaſure to inform you that your *Practical Arithmetician* meets with every Perſon's Approbation that I am acquainted with who has read it. I wiſh the Sale of this Book may be equal to its Merit.

I am, Sir, your moſt humble Servant,

GEORGE PERROTT.

To the PALLADIUM-AUTHOR.

Helſby, Cheſhire, March 21, 1774.

P. S. I received your Letter, and, ſince that, your *Book of Arithmetic*, which has, in a Manner, rendered all other Books upon that Subject uſeleſs. I ſhall recommend it at all Times as the moſt uſeful Book of the Kind.

Your's,

JOHN HARRISON.

To the PALLADIUM-AUTHOR.

SIR, *Frodſham, Cheſhire, March* 28, 1774.

I have got one of your *Practical Arithmeticians*, which, I muſt own, is a proper Piece for any Schoolmaſter to bring his Pupils to a clear Knowledge of that curious Art in a little Time. I am, with much Eſteem, Sir,

Your moſt obedient Servant,

WILLIAM HAYES.

The following are the APPROBATIONS *and* OBJECTIONS *we have received.*

To the PALLADIUM-AUTHOR.

SIR, *Cottingham-School, June* 29, 1774.

I got a Dozen of your *Palladiums*, and Half a Dozen of your *Arithmetics*; and we have had many in our School ſince. I fancy it meets with a pretty good Sale. I am very fond of it; but I wiſh there had been *more Examples*, after *Proportion* begins, without *Solutions* at large, except where you have improved the Method of Solution. Mr. *Judſon* had the ſame Quantity of Books with myſelf.

I am, Sir, your moſt humble Servant,

WILLIAM HARDY.

To the PALLADIUM-AUTHOR.

SIR, *Cawthorne, March* 26, 1774.

I have taken in your *new Syſtem of Arithmetic*, and think it a very curious Thing of the Kind; but I think if you had inſerted *more Queſtions* it would have made it much more uſeful, and would have been preferable to publiſhing them ſeparately, as you hint. I am, Sir,

Your moſt obedient humble Servant,

JOSEPH SCOTT.

REMARK

REMARK *by the* PALLADIUM-AUTHOR.

IF *more Queſtions* had been publiſhed in that Work than thoſe which were thought moſt neceſſary for Uſe, the *Bulk* and *Expence* of the Work had increaſed too much to anſwer its End to the Buyer and Seller; which are Conſiderations of Moment. A Multitude of *Queſtions* and *Solutions* muſt be printed to pay the Expence, (like *Dodſon's* 3 Volumes of *Queſtions,*) except a *Mill* could be made, or found out, like Dean *Swift's* Mill for forming Poems, by turning about a Handle, ſo as to make any Subject viſible on Paper, without the Expence of printing by a Preſs and putting a Multitude of Letters together, and alſo caſting them by Hand, now done with great Labour and Expence.

To the PALLADIUM-AUTHOR.

SIR, *London, June* 11, 1774.

With Reſpect to the *Plunder* of the *Witchelian Calculus* by the *Plumian* Profeſſor, (whereof he was *unjuſtly* accuſed in the *Gentleman's Magazine* for *May*, 1773,) mentioned at Page 65, *Pal.* 1774, the *Method*, ſaid to be plundered from the Perſon who ſold his Right therein to the Government for about 200*l.* to do with it as they pleaſed, certainly could be no Robbery. The Government had a Right to direct the *Plumian* Profeſſor, or any other Perſon or Profeſſor, to extend the Plan, and print the ſame. Had the Plan been approved when it was extended and printed, as it was not, when offered to ſeveral of the Gentlemen of the Navy for *Trial*, it was their Right to receive it from the Extender and Improver of it; but the Expence of a thick Folio Volume (of the Size of a Church Bible) was rejected, as cumbrous and uſeleſs. The *Witchelian* Calculator might, with as much Reaſon, have repined at the Loſs of his *beloved Plan*, (for which he was paid,) had the *Plumian* Profeſſor extended it, by the Help of his *Iſraelitiſh* Aſſiſtant, to immenſe Calculation, from every Degree of Altitude of the *Moon* and *Sun* or a *Star*, and every Degree of their *Diſtance*, to every *Minute* of the ſame, *in* 100 *Volumes Folio* And where then can be the *Robbery* in extending a Right? The Contriver of this paid-for, uſeleſs, incorrect, and exploded Plan, had even no Right to complain of an *Extenſion* of it, not done by himſelf, nor yet of *Injuſtice*, when none was done him.

The *Muſkelynian Calculus* (like the Road to the old City of *Troy*, round and round about it) is as redundant and immethodical as the *Mariner's Guide*.

The *Lionian Calculus*, for finding the true from the apparent Diſtance of the Objects, is a *Prolixity*, never put in Practice by any but the *Iſraelitiſh* Author himſelf.

Mr. *Dunthorne's Calculus* is truly worthy, and *preferable*, for its *Shortneſs* and *Truth*, to all the other pretending *Calculi*, but never recommended, and rewarded as ſuch, by the *Muſkelynian Influence*, bent on its own ambitious Schemes and ſelfiſh Views, to reward the *ſervile Illiterati*, and *libelling Champions*, in Defence of Ignorance, Littleneſs, and Abſurdity; like *Iſrael's* Mutilation of *Halley's* Works, who never underſtood them; who ſhould have left them to *Dunthorne* to elucidate, if they wanted Explanation; or elſe have explained the *Newtonian Principia*, (to convince us of his Sagacity,) before he undertook ſo arduous and unequal a Taſk, requiring the Judgement of an *Emerſon*, or Skill of a *firſt-rate Mathematician* to perform. CRITICUS.

REMARK *by the* PALLADIUM-AUTHOR.

A new *upſtart Method* of *Longitude*, previous to the *Pendulum* one, has been erected, in an *eighteen-penny* Pamphlet, by an Author who ſigns his Name *T. Kean*. This *new Profeſſor* of Longitude, (like ſome of the old ones) performs.

forms his Taſk by *exactly proportioning* the Moon's true *central* Altitude taken, in any Hemiſphere, from *Greenwich* Meridian, as equally *increaſing* (in *Weſt* Longitudes) or *decreaſing* (in *Eaſt* Longitudes) quite round the Globe, in her advancing alſo proportionally, or equally, in Time, through all the Meridians, according to the whole Time of one Revolution of the Moon, to the ſame Meridian of *Greenwich* again: And this at her Morning, Noon, or Evening, Altitudes, as taken at her Riſing and Falling, in each Hemiſphere. The Operation, he tells us, he performs without any Dependance on Night-Obſervations and unſkilful Aſſiſtants. But it is a Theory wholly grounded on *Error* and *falſe Principles!* His *greateſt* Correction of the Ship's *dead Reckoning* of Longitude never exceeds *three Degrees*, which dead Reckoning is often many more Degrees farther from Truth.

The *Angle of Time* at the Ship, from the Meridian, he *increaſes* or *decreaſes* by Gueſs in another *ſpecious Calculation* by Logarithms, according to *trigonometric Rules*, till, by repeated Operation, he makes his *firſt erroneous Correction* of the *dead Reckoning*, and his *ſecond ſpecious Calculation* of Longitude, correſpond. Then he infers *probatum eſt*.

OBSERVATIONS *on the* TIDES.

1. *THE ebbing and flowing of the Sea is cauſed by the Attraction of the Sun and Moon.*

2. *At the Time of the new and full Moon the Tides are the greateſt, and in the Quarters the leaſt. The former are called Spring Tides, the latter Neap Tides.*

3. *But the Spring Tides do not happen on the Day of the Change and Full, nor the Neap Tides on the Days of the Quarters, but about three Days after.*

4. *The greateſt Tides are when the Moon (and alſo the Sun) is neareſt the Earth.*

5. *The Tides are higher when the Moon (and alſo the Sun) is in the Equinoctial.*

6. *The Tides are greater in leſs Latitudes than in greater.*

7. *The Times of the Tides happening in particular Places may be very different, according to the Situation of thoſe Places, and alſo the Height.*

8. *As the Moon is the Cauſe of a Tide in our Sea, ſo the Earth will raiſe a Tide in the lunar Sea, if there is any; which Tide will be greater in Proportion to the greater Force of the Earth, by Attraction, (about 40 to 1,) and leſs in Proportion to its leſs Diameter, (1 to 3.65.) Therefore, if the Moon raiſes our Tide 8.6 Feet, our Earth will raiſe the lunar Tide about 9.3 Feet. But, as the Moon always turns the ſame Face towards the Earth, the lunar Tide will remain fixed without Reciprocation; and the Moon thereby will put on the Figure of an oblong Spheroid.*

Emer. Geog. P. 36 to 38.

In the Globe of the Earth it is probable there is more ſolid Earth than Water, and more ſuperficial Water than Earth. Emer. Geog. P. 17.

REMARKS *on the* VARIATIONS *of the* PERIODICAL REVOLUTIONS *of the* CELESTIAL BODIES *in their Orbits.*

IN Dr. *Halley*'s aſtronomical Tables it is obſerved by that great Aſtronomer and Mathematician, that *Jupiter*'s annual Period, from 1667 to 1689, (22 ſolar Years,) was 12 Minutes of Time *longer* than either of his preceding or ſucceeding Periods.

That *Saturn*'s Period, between 1668 and 1698, (30 *ſolar* Years,) was *ſhorter* than his mean Revolution by almoſt a *Week*. And another Period, completed

completed between 1689 and 1719, was longer than the *mean* Revolution by about as much. So that the *Difference* of their periodical Revolutions was about 13 Days.

That, in 1683, there was a Conjunction of *Jupiter* and *Saturn*, in thoſe Parts of their Orbits which are *neareſt*, when *Saturn* drew *Jupiter* a little *farther* from the Sun, and *Jupiter* drew *Saturn* a little down towards the Sun, by their mutual Attractions; cauſing a *Change* in both their Orbits; as (at P. 65, *Pal.* 1770) has been obſerved of the Moon's Orbit, from the Action of the Sun, Earth, and Moon, on each other.

In 1683, there was a Conjunction of *Jupiter* and *Saturn*, in thoſe Parts of their Orbits, where, by the Situation of their *Apſes*, thoſe Planets approached ſo *very near* to each other, that their joint Forces urged *Saturn* towards, and *Jupiter* from, the Sun; when *Jupiter*, having his proper Velocity *increaſed*, and the Sun's centripetal Force being *decreaſed*, ran out into a greater Orbit, requiring a greater Time of Revolution. When *Saturn* had his proper Velocity *diminiſhed*, and, being urged with a greater Force towards the Sun, was compelled to move in a leſs Orbit, and conſequently to revolve in *leſs* Time.

And, ſhould the ſame happen again, with *Jupiter* in *Leo*, it may be juſtly expected that the *Deviations* found in their two Motions, owing to the joint Efficacy of *three Centers*, may be adjuſted by the *Newtonian* Geometry: If not, and the Periods ſhould prove *longer* where they are now *ſhorteſt*, or the *contrary*, ſome extrinſic Cauſe muſt be ſought, of which we are now ignorant.

The Earth and Moon are affected by the Sun and Planets in the ſame though leſs forcible Manner, cauſing a continual Change both of their Orbits and periodical Revolutions, which become ſenſible after a ſhort Time.

Therefore, as the Earth and Moon's Orbits undergo continual Changes, (but the Moon's Orbit the more ſenſibly,) the preſent lunar Theory and Tables will anſwer to Obſervation but for a ſhort Period. And theſe Changes invalidate and unſettle all lunar Theories of the Moon's Motions (except for a ſhort Space of Time) by the mutual Perturbations of the Sun *and* Moon, *the* Earth *and* Jupiter; *which can only be compenſated for, in Tables, by an allowed Variation of mean Motion, from the beſt and moſt diligent Obſervations. And it is the Work of ſucceeding Ages to correct and improve the lunar Tables to a Degree of Accuracy, while the mean and true Motions of the Moon undergo ſo many Changes.* PALLADIUM-AUTHOR.

To the PALLADIUM-AUTHOR.

REMARKS *on the* NAUTICAL EPHEMERIS, 1774.

NAUT. EPH. 1774. 1220 Longitudes and Latitudes of the Moon, from Dr. *Bradley*'s Obſervations, between *September* 30, 1750, and *November* 2, 1760. Compared with a Set of Manuſcript Tables by Dr. *Bradley*, patched up from *Mayer*'s Manuſcript Tables. — Mr. *Ch. Maſon* had the chief Management of *Bradley*'s Obſervations, though Mr. *Maſkelyne* puts in for his Mite of Credit by the Board's Order. Who calls theſe 1220 *Obſervations* the *Touchſtone* for trying all *lunar Tables* and *Theories*, and the Means of improving them. That theſe 1220 Obſervations comprehend more than a *Period* of the Moon's Apogee. —To theſe *wonderful Tables* are added the Elements of the *lunar Tables* with which the Obſervations were compared. — Elements of Profeſſor *Mayer*'s ſecond Tables, and of a printed Set of Tables (patched up from *Mayer*'s) by one *Gael Morris*. — All depending on *Mayer*'s Equations.

Mr. *Iſrael Lyons* (a *Jew* Name) gives a *Problem*, and *Demonſtration*, (ſuch as it is,) to find the *Error* in the *meridional Teleſcope* to a Hair-ſplitting Exactneſs;

and adds two notable Examples, (no one will follow) of computing the Longitude *prolixly*

Quære. How can a *Series* of 1220 Obſervations of the Moon's true Places compare with the patched-up Elements of *lunar* mean Motions?

The *Maxima* of *Mayer*'s firſt Manuſcript Tables, his printed Tables, *Bradley*'s and *Morris*'s Tables, differ but by a *few Seconds*; being all Patch-work from *Mayer*'s manuſcript and printed Tables. Which Gentlemen were not known to have *Abilities* to form any Equations except by the Aid of Others.

Quære, Why *Bradley*'s and *Morris*'s Equation-Tables ſhould be the ſame as to the Number of Equations (XI.) with *Mayer*'s manuſcript and printed Tables, and differ from one another but by a few immaterial Seconds!

Anſwer. Theſe Elements are all patched up from *Mayer*'s Tables; the Moon's *equatorial Parallax* Tables, (XIII.) and *Bradley* and *Morris* follow the ſame Pattern.

Dr. *Bradley* and Mr. *Morris* adopted (according to Mr. *Maſk*—) Mr. *Mayer*'s *Ratio* of the *equatorial* to the *polar* Axis, as 200 to 199, in *Mayer*'s Tables, who knew juſt as much as either of them. — Mr. *Mayer*'s printed Tables refine upon this *aſtronomical Doubt*, and make it 231 to 230; being juſt as ſure as the *other Ratio*.

The Rev. *Nevil Maſk*—, B. D. F. R. S. (in the *Nautical Ephemeris*,) makes Remarks on *Hadley*'s Quadrant; very great! His favourite *Colly Garden Tragedy*, by *Lanionius Long-Breeches*, (reviſed by a *little Author* in *little Breeches*,) exceeded not the Sagacity.

I have another *Scruple* about a *fifth Edition* of *Sherwin*'s *Logarithms*, reviſed, mutilated, and deprayed, by ſome careleſs and injudicious *Compiler*, (for Gentlemen on *Tower-hill*, to their great Loſs!) ſo as to be unfit for Uſe* at Sea, (and Sea-Officers cannot uſe it,) on Account of the *numerous Errors* and *Abſurdities* introduced, deviating from the old correct, plain, and uſeful, Edition, reviſed and improved by Dr. *Halley*.

Merlin's Cave, near *Iſlington*, TOM SCRUPLE.

June 24, 1774.

* *Examined by ſeveral judicious Sea-Officers, who find it unfit for Uſe.*

NUMBER VII.

ALPHABETICAL CHRONICLE *of the* BEGINNING *of* COURTS *of* JUSTICE, LAWS, *and particular* CUSTOMS, *in* ENGLAND.

Bef. & ſince Chriſt.

Admiral of England, the firſt *a* 1386

Admiralty, Court of, incorporated, June 22 1768

Affirmation of the Quakers firſt accepted in Place of an Oath 1702

Allegiance, Oath of, firſt adminiſtered 1606

Berkley, Judge, arreſted on his Seat, in the Court of King's Bench, and ſent to Priſon, for giving his Opinion in Favour of Ship-Money, Feb. 10 1640

Bigamy Statute firſt paſſed 1277

Chancery Court erected by William the Conqueror.

Children forbidden by Law to be ſold by Engliſh Parents 1015

Circuits of Judges eſtabliſhed *a* 1176

Common-Pleas, Court of, eſtabliſhed 1215

Coronation-Oath firſt uſed 979

Coventry Act paſſed, 1699; made free of Tithes 1652

County-Courts firſt erected 896

Courts of Juſtice, at Athens, inſtituted *b* 1272

Curfew-Bell eſtabliſhed by William the Conqueror 1088

— aboliſhed 1100

Danegelt, a Law-Tax, firſt eſtabliſhed by Etheldred 1002

— aboliſhed by Stephen 1136

Doomſday Book begun 1060

— finiſhed 1085

Drunkenneſs forbidden by the Canon Law to the Clergy 741

Duelling,

Different EFFECTS *of* LABOUR *and* PLEASURE.

1. LABOUR and PLEASURE are very different in their Ends and Effects.

2. When a good Work is done with Labour, the *Labour* vaniſhes, but the *Work* remains with him that wrought it.

3. When *Evil* is done with Pleaſure, the *Pleaſure* flies, but the *Evil* remains with its Author.

4. Works of Utility ſweeten Labour, but Works of Evil turn Pleaſure into Shame.

5. While Men are working *Good* they are ſcattering Seeds, which, after harrowing, ripen into Happineſs for themſelves, and give a laſting Reputation to their Memories.

6. Well-beſtowed Benefits redound to the *Donor*'s Honour.

7. If the *Succeſs* of an Action prove *ungrateful*, when it is done with Integrity and Uprightneſs of Intention, the *Donor* is rewarded with an *inward Satisfaction*, whereby he is guarded againſt the Darts of evil Returns.

8. The greater the Labour and Hazard are of any Undertaking, the ſweeter is the Remembrance of it when paſſed.

9. In *eſcaping* Dangers, a Man may find himſelf favoured by Providence, guarded by ſome Guardian Angel, or Genius, he was not aware of, miniſtering Conſolation to his Mind.

10. Ignoble and inglorious Acts, though they caſt a *Blaze* before a corrupt Mind, yet the *Fire* is ſuch as conſumes Houſes, where the *ſhining Flame* is mixed with a horrid Smoke, which being over, the Remainder or Ruins leave a *noiſome Stench* behind.

11. *Tarquin*'s Rape, committed on the fair *Lucretia*, in which he took an *evil Pleaſure*, was followed by the Ruin of his Houſe and the Extirpation of Monarchy.

12. When *Lyſimachus* was obliged to yield to the *Scythians* through Thirſt, he, for a long Time, bewailed his parting with ſo great a Happineſs as his *Liberty* for ſo ſhort a Pleaſure as the gratifying his preſent thirſty and uneaſy Appetite.

13. A wiſe Man never repined at a good Action, but always repented of a bad one.

14. Every Thing brings forth Fruit after its Kind.

15. Honeſt Labour brings forth good Fruit, and evil Pleaſure brings forth the Fruit of its Kind.

16. As an Ewe brings forth a Lamb, ſo a Serpent brings forth a Serpent.

17. Good Actions beget good Returns, and evil ones beget Returns of the like Kind, *as the Echo begets Returns proportionable to the Voice.*

18. The *Mirror*, by Reflection, reverberates the *Beams* as bright as the *Sun* from whence they proceed; but *Clouds* caſt a Shade as *gloomy* as the Fogs that generate them, or as the miſty Fens they are exhaled from.

19. He, that expects good Fruit ſhould proceed from an evil Diſpoſition, may, with as much Confidence, expect Thiſtles to bring forth Figs; or may as reaſonably expect a Crop of Wheat from ſowing the Soil with Nettles.

20. Honeſt Labour ſhould be preferred before vicious Pleaſure, if a Crop of Satisfaction be expected.

21. To be in the Catalogue of the unfortunate, is better than to be in the Liſt of the abandoned and wicked.

22. A *Crown* is not worth taking up, or enjoying, upon ſordid, irreligious, and diſhonourable Terms.

Of GEOGRAPHY *and* HISTORY.

AS the Mind of Youth, like an *uncultivated* Soil, requires Improvement, in Order for its Production of genuine and uſeful Knowledge and the Growth of future Genius, it is neceſſary to furniſh it with ſhort Plans of *Geography* and *Hiſtory*, as ſoon as the mental Faculties are fit to receive thoſe important Impreſſions. Theſe early and uſeful Ideas not only divert the Minds of Youth from the idle Habits and vicious Practices to which they are naturally prone, and addicted to learn from one another by ill Example, but carry them forward in the proper Purſuits of *ſolid Learning* and *real Happineſs*. In Order to which, their Introduction to *Geography* and *Hiſtory* (eſpecially *natural Hiſtory*) is moſt conducive to give the Minds of Youth a *ſolid Turn*, or *Propenſity*, for their laſting Advantage, inſtead of filling their Heads with the Principles of Corruption, or whatever tends to deſtroy the Mind's future Improvement: And ſuch are abſurd and romantic Tales, related by the old Women and ignorant Friends and Acquaintance they are daily bred among; alſo poiſonous Books and Novels, put into their Hands to read, for their daily Amuſement, by thoſe who are no Judges of, and never had a proper, Education.

As an *Inſtance* of the great *Ignorance* and *Error* that have prevailed in all former Ages, and are not yet totally extinct from among us in the preſent Age, you will find that great Numbers of grown-up Perſons have not the leaſt Notion or Idea that our *Dwelling Place* is a *Globe of Earth and Water*, which is inhabited by *Antipodes*, or Perſons walking or ſtanding with their Feet oppoſite to ours, at the Diſtance of our Globe's Diameter. As in moſt *Roman Catholic* Countries the People are not only taught, but are commanded, to believe (on the Peril of a ſevere Puniſhment and being put in a *horrid Inquiſition*) that the Sun moves round the Earth, and not the Earth round the Sun; being a Doctrine inconſiſtent with numerous aſtronomical Experiments and plain Obſervations. And moſt Perſons, poſſeſſed of what is called a common Education, (*having learned to read and write*,) conceive the *Earth* and *Sea* together, which we now inhabit, to be a *very large and long extended Plain*, to which they know no Bounds: And ſome have aſſerted, that Men have travelled ſo far towards the World's End, and ſo very near it, that they have waſhed their Hands in the Clouds there gathered together. Others have maintained that Admiral *Drake* ſhot the Gulph (ſuppoſed by them to be a vaſt *Whirlpool* of collected Waters, running, like Water through a Funnel into a Bottle, to the Part of the Globe oppoſite to the Place where his Ship had arrived) quite into the oppoſite World, (making an upper and lower Plane of our Earth,) and ſounded a Trumpet when he was got under *London* Bridge: So ignorant, confuſed, and abſurd, were and are the Ideas of moſt Men concerning the Nature of our Earth and Sea.

To remove all which erroneous and childiſh Conceptions, our *Account of Geography*, in the conſtituent Parts of our Globe, is intended, *in next Year's Palladium*. And firſt, an *Account* of the celebrated Captain *Cook*'s *Voyage* round the World, in his Majeſty's Service, in the *Endeavour*, and the Places he touched at, and Diſcoveries he made, is offered for the Satisfaction and Improvement of our Youth at School, and of all our other Readers.

A VOYAGE, *ſailed on Diſcovery, round the World, through the* Atlantic Weſtern *Ocean*, South-Seas, *and the* Eaſtern *Ocean, ſtill ſailing* Weſterly, *in Return Home, by Captain* Cook, *Commander of the* Endeavour; *with Mr.* Banks, *Dr.* Solander, *Attendants, and Seamen, on-board, in Number* 96.

CAPTAIN *COOK* ſet Sail from *Plymouth* on the 26th of *Auguſt*, 1768, proceeding in his Voyage *Weſterly*, through the *Atlantic*, to the *South Seas*; and then,

then, after his Stay there, keeping his Courſe ſtill *Weſterly*, to the *Eaſt-Indies*; meeting, in his Paſſage thither, with many *ſurpriſing Accidents*; and he thence ſet Sail, and returned to *England* on the 12th of *July*, 1771.

In the Courſe of this Voyage Capt. *Cook* has given ſundry Inſtances of his Perſeverance, perſonal Courage, and Diligence, in the Diſcoveries he has made, and of his unſhaken Intrepidity in the ſeveral Difficulties and Hardſhips he encountered; wherein the Dangers he eſcaped are, at leaſt, equal to thoſe of any former *Circumnavigator*: So that no Perſon, of a leſs enterpriſing Genius and Diſpoſition, could ever have brought the *Endeavour* ſafe back to *Old England*, after engaging with ſo many almoſt inſuperable Difficulties. Yet it was his happy Lot (by his ſteady Perſeverance extricating himſelf from all theſe Difficulties) to arrive with Safety and Honour at laſt. His real Merit in this his firſt Voyage having recommended him to the Lords of the Admiralty, he was ſent round the World a ſecond Time in the *Reſolution*, not yet returned, in Company with the *Adventure*, Captain *Fourneaux* Commander, who is lately returned, with the melancholy Account of ten of his Men unguardedly going on-ſhore, at *New-Zealand*, for Greens and freſh Proviſions, being ſeized and eaten by the *Cannibal* Natives, and their picked Bones (the Fleſh having been taken off to broil or eat raw) were found, by Others of the Ship's Company, ſcattered on the Ground. The Particulars of which Voyage will be given, no Doubt, by Order of Government, hereafter. Captain *Cook* is on his Paſſage Home; from whom, when he arrives, we hope to have an Account of his farther Diſcoveries, and the Laurels will be juſtly beſtowed on him, due to his enterprizing Atchievements, in his *ſecond Voyage* round our variouſly-inhabited Globe.

Mr. *Banks* and Dr. *Solander* (two Gentlemen of eminent Abilities) have greatly contributed to the Advancement and Honour of the *firſt Voyage*, with Captain *Cook*, in the ſeveral Diſcoveries they have made in new *Plants*, *Shells*, and *Animals*, by an Augmentation of one Thouſand different *Species*, before unknown, to thoſe already diſcovered. But Mr. *Sidney Parkinſon*, their curious and diligent *Draughtſman*, dying on his Return from *Batavia* in *January* 1771, was a great Check to any farther Improvements being made.

By the *Diligence* of the ſaid *Sidney Parkinſon*, numerous Plants, Shells, and Animals, were accurately delineated, and *Portraits* given of the different Inhabitants and their Dreſſes. Who made numerous Obſervations and Drawings, reſpecting the Iſlands, Countries, and Coaſts, where the *Endeavour* paſſed in her Voyage; which his Brother, *Stanfield Parkinſon*, of *London*, publiſhed (notwithſtanding the arbitrary Methods made Uſe of to prevent the Publication) at the Ship's Return.

Mr. *Sidney Parkinſon* alſo collected, by his Diligence Day and Night, *Vocabularies* of the Languages, ſpoken in the Iſland of *Otabeite* and Iſlands adjoining; alſo of *New-Zealand*, a large remote Iſland, extending from the North to the South Cape, between Latitude 34 and 48 Degrees South, and, from Cape Eaſt to Cape Weſt, from Longitude 181 to 194 Degrees; alſo *Vocabularies* for *New-Holland*, the Iſland of *Savoo*, *Batavia*, (a *Dutch* City and Settlement in the *Eaſt-Indies*, in the Voyage round the Globe,) the Language of which is called *Low-Malay*; *Anjanga*, on the Coaſt of *Malabar*, in the *Eaſt-Indies*, called at *Batavia* the *High-Malay*; the Language of the Natives of the Iſland of *Sumatra* in the *Eaſt-Indies*; of the Natives of *Ceram*, an Iſland there, and (ſailing ſtill round) the Language ſpoken by the People of the large Iſland of *Madagaſcar*; (the Ship continuing her Courſe ſtill *Weſterly*,) that by the Natives of the River *Gambia* in *Africa*, after paſſing the *Cape of Good Hope*, a *Dutch* Settlement. Which different Languages, it ſeems, were collected by the amazing Diligence of the ſaid *Sidney Parkinſon*.

From the Time of the *Endeavour*'s Departure from *England* to the *South-Seas*, paſſing Cape *Horn*, *Weſterly*, the Natives and Country of *Terra del Fuego* occur;

occur; then the Iſland and Natives of *Otaheite* in the *South-Seas*; an Obſervation of the Tranſit of *Venus* there; the different Riſings and Fallings of the Thermometer during the Ship's Stay at *Otaheite* and the neighbouring Iſlands; the Plants, medical and culinary; the warlike and domeſtic Inſtruments next occurring. Alſo Views of the Headlands, Appearances and Nature of the rocky Coaſt, Country, and ſavage Inhabitants, of *New-Zealand*, ſtill more *Weſterly*; their Chiefs, Warriors, and War-Canoes: Picturesque Views of the Coaſt, ſingular Head-Dreſſes of the Natives, military Weapons, houſehold Implements, and perſonal Ornaments; alſo a curious Map of the Coaſt of the large Iſland of *New-Zealand*. Then the Natives and natural Produce of *New-Holland*, ſtill more *Weſterly*, and the Natives of *Savoo*, and Inhabitants of *New-Guinea*, their Cuſtoms, and Perſons trading thence to *Batavia*; the *Endeavour*'s Paſſage from thence to the *Cape of Good Hope*, and (ſtill ſailing more *Weſterly*) to her Arrival in the *Engliſh* Channel from whence ſhe firſt ſet out.

All which Voyage, being a continual ſailing on a Courſe ſtill *Weſterly*, from the Beginning to the End thereof, is an *infallible Proof* that the *Earth and Sea* are of a round or globular Figure; of which our Forefathers had no Notion or Idea.

In the Courſe of this Voyage, Captain *Cook*'s Prudence and Firmneſs appear in many remarkable Inſtances; and in none more than in his reſcuing the *Endeavour*, and the Lives of all the Ship's Company, from Deſtruction, after ſhe had ſtruck upon a Rock on the dangerous Coaſt of *New-Zealand*, when a *ſquare* Piece of that coral Rock lodged in her Planks, which, with pumping, and ſtopping the Leak by the Artifice of Captain *Cook*, was the chief Means of the Ship's Preſervation. This Piece of Rock was afterwards taken out from the Place of the Ship's Leak, when ſhe was, by Care, got into a Rivulet, or Channel, to lie on her Side upon the Bank at low Water, and then laid on her other Side, on the contrary Bank, ſo as to make her again, by repairing, completely fit for the Sea: All which ſhews that no Difficulty, to Captain *Cook* and his brave People, was inſuperable, in the Power of human Prudence and Reſolution to accompliſh. And, had not this Commander treated the ſavage Natives as he did and directed, by firing upon them and deſtroying many, *(a cruel Neceſſity!)* they might have proved a dangerous Enemy to the Ship and Company, with ſo many Canoes, filled with Inhabitants, ready to board him on ſeveral Occaſions. And, probably, the *Adventure*'s Men, who went on-ſhore ſo unguardedly at *New-Zealand*, would not have met with the Fate they did, had they taken the ſame wiſe Precautions, with Fire-Arms, for their Preſervation, on their going on-ſhore, as the *Endeavour*'s Men always did.

In *New-Zealand*, and other Iſlands of the *South-Seas*, there are found very few Quadrupeds either for Uſe or Food; from which, and the Ignorance and Indolence of the Natives in the Cultivation of their Lands, the Cauſe of their ſavage Diſpoſition, in living upon one another and on ſuch Strangers as they can ſeize as Enemies, is aſſigned. And the ſame Reaſon is given (beſides what the ſavage Cuſtom warrants) for thoſe Inhabitants reſiding in the remote Parts of *Chili*, or *Peru*, in *America*, and in the interior *Ethiopia*, in *Africa*, for devouring each other, like Fiſhes in the Waters, and Animals of Prey in the Foreſts, to ſatisfy the Calls of Hunger.

The whole Account of Captain Cook's *Voyage may be ſeen in* Sidney Parkinſon's Journal *of this Voyage to the* South Seas, *a curious, large, and elegant, Elephant Quarto Volume, or in Dr.* Hawkeſworth's *Account of the ſame Voyage, in three Quarto Volumes, being the Ship's Journal, publiſhed by Order of Government. Captain* Cook's *Voyage in the* Reſolution, *and Captain* Furneaux's *Voyage in the Adventure, round the World, will, no Doubt, be publiſhed in due Time.*

PALLADIUM-AUTHOR.

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Stepney, Nov. 24, 1773. THOMAS STUCKFIELD.

THE END.